FOOD INDUSTRIES

The Journal Devoted to the Problems of the Food Manufacturer

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Protein Prices Affect Your Business

Are You Looking Ahead?

ASK YOUR WIFE how she plans her meals. Eight or nine times out of ten she will decide first on whether the protein food which she will serve shall be eggs, cheese, fish, meat, or poultry. Then she usually decides what other food goes best with the protein. It may be that she does not make her choice until she is actually in the retail store and has compared prices, but once the basis has been chosen, the rest of the meal usually is limited to those items which form a pleasing dietary combination with the protein.

PROTEINS are the backbone of the meal. If you are manufacturing some other kind of food, the chances are very strong that your opportunity to sell it to the housewife is very closely tied up with her choice of the protein basis of the meal. Thus if she follows the Lenten custom and serves fish, she would hardly buy sweet rolls to go with it. When she serves scrambled eggs, her husband would not often expect to eat creamed corn at that meal. And when she serves cheese soufflé, he would not appreciate creamed turnips. He would like sautéd pineapple with broiled ham, but with steak or lamb he would prefer buttered peas. Roast pork and apple sauce are traditional companions, just as French fried potatoes nearly always accompany fried sea foods. The delicate flavor of roast lamb would be spoiled by serving fried onions with it, and with veal cutlet, potato chips would be dry and uninteresting.

YOU may not be a meat packer, you may not even own a single share in the meat packing company, but your sales are fairly definitely tied up with the competitive situation in packing-house products. If the lure of the bargain lies toward pork, the sales of many other foods will be influenced either favorably or unfavorably.

WHAT is the situation in your own business? This is something which you, as an individual, must figure out for yourself. When manufacturers are scheduling production for a given period, the trends of protein foods should be considered, as well as the statistical position of directly competitive foods. Trends in livestock production are capable of fairly accurate forecasting, for they depend to a large degree on the situation in carbohydrate feeds.

TO ILLUSTRATE one of the trends which is capable of reasonably accurate future discernment, FOOD INDUSTRIES presents elsewhere a brief discussion of the interpretation of the corn-hog ratio. The present indication is that pork production will continue at its current level or be increased slightly for several months, and is likely to continue on this trend until the size of the field corn crop is known and that it is safe from late or early frost, or until marked price changes occur for this basic commodity. Readers should interpret this trend in terms of their own business and schedule their production with a thorough understanding of the inter-commodity competitive situation.

FROM time to time other fundamental studies will be presented in these pages with a view to extending the foresight of the various branches of the food industries as they affect one another. The food market is limited in volume by the number of people to be fed. An average consumer eats about a ton of food each year. Who will sell it? What branches of the industry will get their share of the business? Which ones will be at a disadvantage from inter-commodity competition? Think it through.

It Is Your Move Now

SOME real good should result from the formation of the Reconstruction Finance Corporation and the proposed Glass-Steagall amendment to the Federal Reserve Act, but just how or when the benefits will be apparent is still the problem of business. Certainly the recent upturn in the stock market cannot be interpreted as anything of really fundamental importance; it appears to be the result of speculative fright and other factors.

Business must take the initiative and grasp some of the aid now directly or indirectly offered through these two measures by securing such financial assistance as will permit the continuance of well-advised modernization programs. To wait for the uncertain recovery of business will be more costly in time and dollars than to modernize today.

A profit can be earned on a modest volume of business if the goods can be produced at low cost. Old-style equipment is hardly ever low-cost equipment, regardless of the excellence of the product turned out. The biggest problem before the industrial world today is to learn to produce profitably on small volumes.

How it may be done is illustrated by a large ice cream company which is replacing a part of its brine refrigerated freezers which are perfectly good, as far as the product is concerned. There is nothing wrong with them except that the processing cost of ice cream frozen in them is too high. Flooded ammonia refrigerated freezers of greater operating capacity (not greater size) are being installed which permit greater flexibility and lower manufacturing costs. The savings accomplished by the newer equipment will be largely converted into profits. Capital investment in this instance will also be reduced as a secondary benefit.

Modernization is the one way for plants to be put into line with the low costs that are imperative today. If it is necessary to borrow money to accomplish these needed improvements, the way is opening up to get it.

Denials Are Not Proofs

VERY SELDOM does one see such a sweeping denial of what we believe to be scientifically proved facts as has appeared in a printed report from a sugar refining company which has recently come to our attention. It purports to describe bacteriological conditions in its refinery and has the personal authority of a university professor of bacteriology. The major part of the publication comprises a discussion of thermophilic bacteria and their importance, or lack of importance, to the sugar refining and canning industries.

We shall mercifully allow the corporation and the bacteriologist to remain unnamed for the present. This report disputes in unequivocal language two of the premises dependent upon which a major part of the bacteriological research of the canning industry has been developed; the first, that thermophilic bacteria may cause spoilage and consequent economic loss in canned vegetables; and the second, that thermophilic spoilage bacteria may be carried by refined sugar and, under some conditions, may lead to spoilage in canned vegetables. We are told in contrast that thermophilic spoilage bacteria (called thermobacteria by the author) play no part in spoilage of canned foods and that no properly refined sugar could possibly contain living spores of thermophilic bacteria. Indeed, it is reported that no thermophiles were found in hundreds of samples tested before, during, and after refining, which, according to other published reports, appears to be a unique experience, to state it mildly.

The reasons back of these contradictory statements are inconclusive and are confused by references which indicate a reprehensible lack of information concerning technological practices followed in the canning industry. Repeated reference is made to "intermittent" or "fractional" sterilization, from which it is evident that the author considers that that antiquated procedure is still used in processing canned foods. In this connection, it is only necessary to say that "fractional sterilization" is an obsolete practice—if, indeed, it was ever sufficiently established to be capable of obsolescence.

To merit serious consideration, the author should offer something in the way of detailed proof to support the conclusions of which the report largely consists. Two large divisions of the food industry have an interest in the subject, and if they have been ill-advised they should have knowledge of the fact. However, until supporting scientific data are forthcoming, existing convictions have not been threatened. And to any other food manufacturers who may have been misguided sufficiently to doubt the existence of thermophilic bacteria we would point out that a perfectly well developed laboratory technique exists which must be utilized if laboratory tests are to mean anything. In the present case the professor of bacteriology, who is a better medico than food technologist, did not know his thermophilic technique nor canning technology.

Water, Water, Everywhere; But What For?

PERHAPS it's because we were not brought up in a dairy that factory floors which are eternally wet never appeal to us. We would like to have some of our dairy readers give us the "low-down" on the reason for the continuation of the traditional wetness of manufacturing departments. Is it because of a love for rubber boots retained from childhood days?

Another tradition that we would not follow one day longer than necessary, if we were in that business, is that of allowing the wash water from cleaning operations for dairy equipment to run across the floors to the nearest drain. Those who have built and equipped plants for wet operations outside the group of dairy industries usually take pride in the consummate skill which they employ in making provision for keeping the plant clean and *dry*.

Teall's Ice Cream Company, of Rochester, N. Y., is to be complimented for a step in what appears to us as the right direction. A dry air conditioner in its plant makes the floors dry within 15 minutes after starting the conditioner. This step toward a dry plant has been attended with real benefits. Illness of employees' heretofore requiring one extra person for every seven on the payroll, was reduced to one single absentee day in 1931. Productivity also has been increased. Sales of packaged goods rose from 30 per cent of total production in 1930 to 58 per cent in 1931, without the addition of extra help or overtime—and this with a slightly greater total production in 1931. All of these were economies directly traceable to keeping the plant dry.

There also were benefits of an aesthetic nature, such as absence of visible perspiration on employees, for, although perspiring is a very homely and perfectly natural

phenomenon, it hardly appeals to the lay visitor in a food plant, whether it be a dairy, bakery, packing, or confectionery plant. This company can advertise that it has "the freezer room where ice cream is made with spring morning air" and back it up with facts.

Other plants are progressing toward dryness, such as Bowman's new River Forest plant, where ceiling condensation cannot occur, and Breyer's ice cream plant in Philadelphia, where drip on the floor of the packaging department has been eliminated.

If there are real reasons for water on the floors in floods, streams, and puddles; or for dampness, high humidity, frosted or dripping ceilings in winter; physical discomfort in summer, let's discuss them.

As a Distributor Sees It

OVERCAPACITY as the neglected factor in distribution has aroused the buyer for one chain of 2,000 stores to write to us a letter from which we quote a few paragraphs:

"I am continuously amazed at the status which has arisen and today faces the quantity buyer, or the man who even in so moderate degree as in my own case controls the direction of buying for a body of grocers. To get the picture, one must invert the recollection of the auctioneer, familiar to most of us in childhood. He offered a bit of merchandise to a crowd of more or less prospective buyers.

"Now—in many lines—a crowd of sales manager-auctioneers strive to sell the one buyer, who, finding himself overwhelmed with offerings, is enjoying the sensation of naming a murderously low price, beyond which he will not go.

"Sales managers are forced into this position by production managers, whose one thought is to keep the corporation broomstick nailed to the chimney of their particular factory, signifying, as you know, that that particular factory is working its men and equipment at higher-geared speed than any other factory in the industry can wring out of its people and machines."

Who Is Right?

WHAT is meant by the term "blanching"? We raise the question because our readers in the several branches of food manufacture will all have differing concepts when they hear the term. We know of at least five meanings that are ascribed to the operation in this field, and we are quite certain that some of them are wrong.

Blanching is the word used by the confectioner to describe the process of removing the skins from certain nuts, such as almonds. The celery grower uses it to describe the process of bleaching his celery, but the canner means the operation of parboiling the vegetables before they are canned. When the macaroni manufacturer uses the term he nearly always means the operation of washing the cooked macaroni with cold water, merely to remove the adhering cooked starch. And when a domestic scientist talks about blanching she means the operation of washing the scalded vegetables with cold water, presumably to set the color as the final step before filling her cans. Who is right?

Our specialized technical language is rapidly reaching a point where, before one man can understand another, he first must ask his business. The difficulty arises from the fact that the English verb *to blanch* is derived from the French verb *blanchir,* which has 24 different meanings in that language that include: lying, and white washing; as well as boiling; scalding; bleaching; whitening; and covering with tin plate.

A Fable of Business

MRS. WHOOSIT decided to drive to Denver because it would be cheaper than to pay railroad fare. Her husband thriftily figured that, because the tires were all in pretty good shape, she ought to make the round trip on them without any trouble. He became still more thrifty, took the spares off the rack, removed the tools and jack, and sold them all, because, he argued, the rubber will deteriorate anyway, whether it is used or not, and, of course, they won't need the tools without the tires.

"I can use the money to better advantage myself," quote he, with an eye to certain other uses to which it could be put. His wife demurred.

"Nonsense," argued Mr. Whoosit, with a degree of what is technically termed acerbity; "you have not had a puncture for three years. Go ahead, and if you get stuck, I'll send you the money to buy all the tires you need."

Mrs. Whoosit was skeptical. "Put it in writing!" she demanded.

And so the journey started, with Mrs. Whoosit, three children, the dog, and baggage, including gifts to Grandpa and Grandma. A neatly worded letter in the pocket of the left front door informed the truly interested reader that P. Preston Whoosit owed the car two spare tires, a set of wrenches, and a jack. He would restore any or all of them when the occasion demanded.

Until she hit a long detour out in Ohio, the going was pretty good, after which, to say it was bumpy is to overlook several perfectly good adjectives and highly colored expletives. Once the wheels spun around in a mud hole, throwing great gobs of plastic real estate in all directions. After finally extricating the car, she discovered that the right rear tire had been irreparably cut and was flat.

A passing farmer, who had not observed the empty tire rack, offered to help her change tires. What Mrs. Whoosit had to say about the spare-tire shortage was not exactly profane, for she did not want the children to hear her use cuss words about their father — richly deserved though they might be—neither was it expressive of the cordial relationship that is commonly expected to exist between man and wife.

The little family obtained board and lodging at a nearby farm house while waiting for the money for a new tire. It seemed, however, that Mr. Whoosit had spent his ready cash in ways not yet ascertained and telegraphed back to her that he would send it in about two weeks. Whenever his wife took out the I.O.U. he had written and then re-read his telegram, the children shrank from her and the dog barked. Already the trip was costing real dollars every day and getting exactly nowhere. She wired Friend Husband to send more funds, but he wired back to borrow some money somewhere, or sell the dog.

Moral: Such is the status of many a depreciation reserve when something blows out in the rough spots on the highway of business.

Do You Know When Your Package Brings Profits?

By FRANCIS CHILSON
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IN THE merchandising of food specialties it is almost as important to know when to drop an item as it is to know when to introduce one. Great lines accumulate "profit barnacles" because, as new items are added, the dead ones are not simultaneously dropped. Most of the packing houses, which now pack very extensive lines began business originally with a few staples. As business flourished, salesmen, dealers, or advertising men saw great possibilities for new products. Very often, when these items were added and commitments made for materials, the market was discovered to be not so extensive as had been imagined. Thus the new items are still carried and the efforts of salesmen and dealers are dissipated over constantly expanding lines, with the result that profits on the staple lines are minimized. On the other hand, it has frequently happened that a new product went over to the "plaudits of the populace" and eventually became not just another good item but the main one in the line.

Often, too, the addition of a new product or line will change the character of the business entirely. The Beechnut Packing Co., for example, is said to do a more profitable and extensive business on its gum and candy line than it does on its food products.

Fig. 1—Crosse & Blackwell carry out the idea of a fish bowl to include fish-shaped particles of orange peel scattered through marmalade

As a general rule, however, the number of new products which succeed are equaled if not exceeded by the number of those that fail. As "failures" we include those upon which inadequate profit is made as well as those which are sold at an actual loss. We are not, of course, including in this discussion products that are added to a line to function merely as overhead carriers. Such items usually are packed in off-seasons and are handled merely for the purpose of keeping the factory force intact, and also for absorbing overhead expense, which otherwise would have to be prorated over the regular line during the busy season.

The trouble with new products which are failures lies in the fact that those responsible for them refuse to admit the failure and to recommend that the items be discontinued and the loss in packaging material inventories written off. Very many manufacturers do not have actual "time-study" costs on each product, and, so long as it continues to bring in one or two hundred dollars a month, it will be continued—to the keen distress of the plant manager, who is thus compelled to disrupt regular production schedules to provide for the manufacture of small batches. In times of economic distress this hesitancy to drop items is accentuated because of the perfectly human reluctance to pare further gross sales totals, which are already declining because of general conditions. There seems to be a greater charm for some manufacturers in gross sales than there is in net profits. Again, some business men hesitate about writing off virtually obsolete inventories, because the loss hurts, and also because they feel that it diminishes their borrowing power at the banks.

To decrease one's assets in the face of bad conditions seems, to short-sighted men, like a business heresy. More than one bank has unconsciously loaned money on obsolete inventories and also on other inventories, which, because of overpurchasing and extremely small consumption, were really *fixed* assets instead of relatively liquid ones. Parenthetically, it may be said that such a deceptive attitude is often fostered by the bankers themselves, because they worship "tangible assets" and greatly discount vision, ability, and all other intangibles.

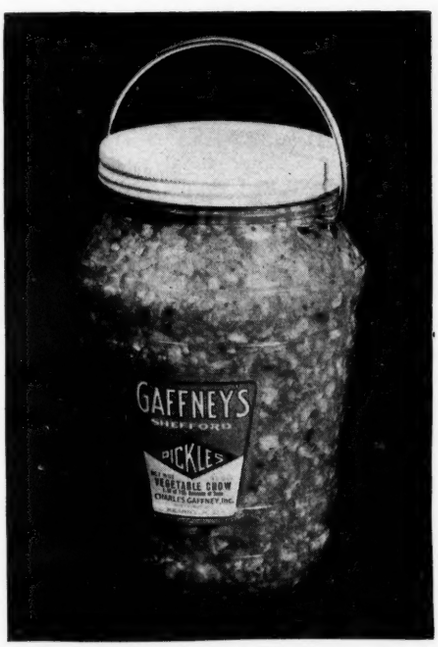


Fig. 2—Glass pail container that has utility use as candy jar or as child's sand-box plaything

Having observed one striking instance of courageous writing off of obsolete assets in the face of trying conditions, and the ready support given by the banks, I have concluded that the manufacturer who is "stuck" with dead inventories will receive all the support he needs if he honestly lays the whole situation before his banker. From the standpoint of really sound business, a "coroner's jury" should be held at least once a year on the entire line and the dead and dying numbers sent to the potters field.

An instance from another industry may be introduced here because it is pertinent and illuminating. This con-

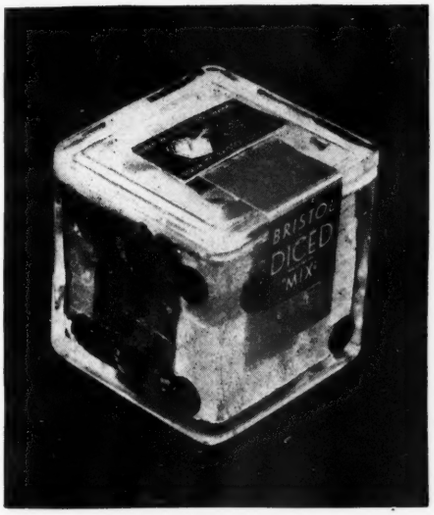


Fig. 3—An intriguing design for a candy jar to be used subsequently as a cigarette case

cern—one of the largest in the cosmetic industry—has for many years followed the policy of dropping items—not when they have expired entirely, but just as soon as the management has become convinced that the item is slipping and there is no prospect of holding it up profitably. This firm is one of the few in that industry which has thus far come through the depression without any diminution of net profit and with extremely little decrease in total sales. As a matter of fact the president of that company told the writer recently that 1930 had been the most profitable year in the history of his business.

Now, it is obvious that new items and new lines must be added from time to time to provide for changing tastes and changing marketing conditions. But an item should never be added to a line that is already profitable unless an exhaustive preliminary market study has first been made, and even the study itself should not be taken as final. It is, of necessity, theoretical. The item should be given a practical test. This necessitates the creation of the product and its package in small quantities to be sold in key localities to test the accuracy of the survey. Many manufacturers hesitate to do this because the creation of the package in small quantities involves considerable expense—often each unit costs several times as much as is received for it. But the expense involved is insignificant compared with the loss caused by the failure, either immediate or ultimate, of products for which extensive commitments for raw and packaging materials have been made. Incidentally, the cost of producing new items on a small scale can be minimized by careful package design—standardizing on existing containers. Even in the industries in which packaging costs are extremely high, this policy is followed by the more progressive manufacturers. The International Cellucotton Co., manufacturer of Kotex, Kleenex, and other paper products, goes to extremes to test a market survey. Up to the present time the company has never had an item fail after it had been introduced into the national market.

The addition of new items to any line is justified only if they increase sales with a concomitant increase in net profits. With due precaution it is easier for the manufacturer of a general line to increase his sales than it is for the manufacturer of a single product.

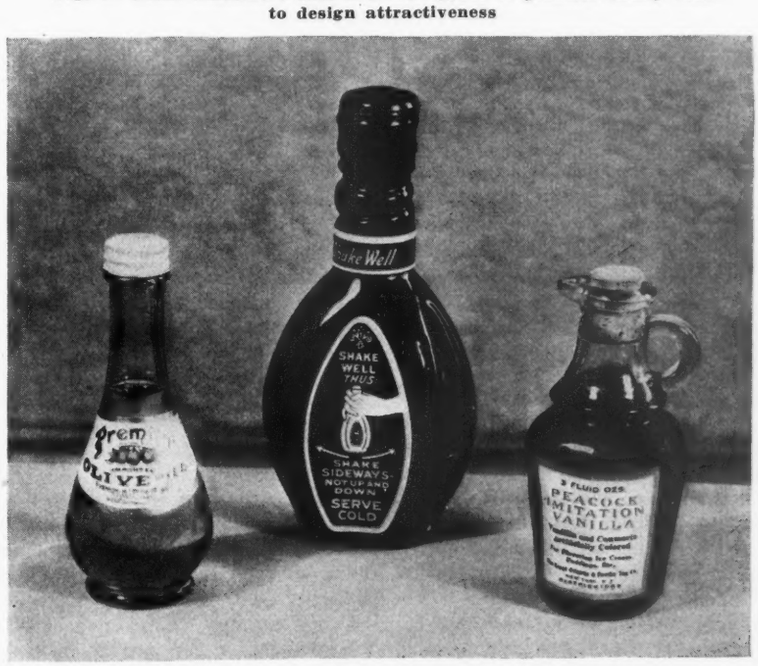
The single product manufacturer who does not wish to add to his line specialties requiring the use of his product, must depend upon ingenious merchandising to increase retail sales. An example of a successful single-product merchandising plan is that of the New England Vinegar Co. This might be called the "sales spurt method," as it is based upon a sudden and forceful drive on a specialty number. This company sells vinegar and cider only. A large part of its output is taken by the chains; the remainder is distributed through the regular branded line of the company, and also through "sales spurts" on specially designed novelty containers.

The president of the company adopted the plan because it provides a sudden increase in sales without impairing the steady, though necessarily gradual, expansion of the regular line. He prepares for the "sales spurt" as carefully and as secretly as a combat officer would prepare for a sudden raid into enemy territory. When such special numbers are introduced they are never introduced with the intention of adding them to the permanent line; they are temporary numbers only. He studies the market carefully to determine what is likely to attract the attention of consumers who are not yet familiar with his products. He then designs a utility container which is different not only from the utility containers of his competitors but different also from all other containers in which liquid products are sold. In doing this he evolves a design which is sure to attract attention because of its novelty and its utility. A certain quantity of the special containers, together with other necessary packaging materials, is bought; the item put up and thrown on the market suddenly. As soon as supplies are exhausted, the number is dropped and preparations are made for the introduction of another one.

This method is followed because he has observed that as soon as a really good container appears on the market, it is at once imitated by competitors, which robs the item of its novelty and acts as a drag on sales. The keystone of the plan is to purchase only enough supplies for the special number so that it can be dropped before its popularity wanes. One season a sweet cider pitcher of striking design was introduced. Sales shot up immediately and by the time competitors got into the market with an imitative number, the inventories were exhausted and the item was ready to be dropped anyway. Such a plan depends for success upon conservative estimates and conservative purchasing. This president is convinced that it is better to be thirty thousand short of what *might* have been sold than to have thirty thousand more than *could* be sold.

Another instance of sales boosting by the introduction of new packages—this time on the regular line—is that of the W. A. Taylor Co., manufacturer of Red Lion olive oil. In three years this company has changed its package four times; the final one represents the ideal and is likely to remain unchanged for some time. This is a strikingly unusual

Fig. 4—Glass containers that add the appeal of possible utility uses to design attractiveness



cruet of highly original design. It is not only useful and ornamental but it is convenient to handle in the factory, in the store, and in the home. It occupies exactly half the shelf space necessary for the decanters previously used.

Sometimes new items are added to a line to provide an outlet for the basic product of the company. This was the case with Otto Seidner, Inc., mayonnaise manufacturer, who, some time ago introduced potato salad simply as a means of disposing of more mayonnaise. This is not the first time that potato salad has been packed, but in this particular instance the result sought after was achieved through the new product. As a matter of fact the new item succeeded so well, after it had been on the market only a short while, that an order for 2,000 bu. of potatoes was placed at one time. It is easy to estimate the quantity of mayonnaise needed for this quantity.

Favorite methods of boosting sales for a limited period on a limited group of items are the cookery slogan or other contests, calling for the use of the sponsor's products. Contests of one kind or another have long been favored by the Larkin Co., of Buffalo, and by McCormick & Co., of Baltimore, particularly. Here again success depends upon knowing when to quit—which is the instant public interest in contests begins to wane. It is difficult to arouse keen interest in contests; hence, the manufacturer who employs them as a sales weapon must know the psychology of novelty.

Very often the alert manufacturer can capitalize current popular trends of thought. In the merchandising of coffee "vacuum packed" is the touchstone of success. In the last two years a great many coffee manufacturers have adopted the vacuum can. Austin Nichols & Co., however, having merchandised coffee in glass jars for years and not wishing to change this package, but at the same time wishing to capitalize the current propaganda, simply changed the seal of the jar slightly, and, as a result, sales increased at once because they, too, were able to offer "vacuum packed" coffee.

For some obscure reason the containers for certain products have always been of a generally similar traditional shape. Catsup is a case in point. The Stokely Co. some time ago decided that this was all wrong and brought out its product in a jar. The new package was well received because of the convenience in using the product. (In passing, it may be well to mention that there appears to be little rhyme or reason to the tall, inconvenient olive bottle, and we hope to see olives generally merchandised in shallow pickle dishes which will make them easy to get at. A step in the right direction has been made through the adoption of the Mason jar, but even this, in our opinion, is still too deep.)

To get back again to our original thesis, a business is like a tree: as it grows new branches and "suckers" shoot out. These growths must be pruned at least once a year if the tree is to bear abundant fruit. Likewise the merchant who knows when to "prune" will, in the long run, consistently earn satisfactory dividends.

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Fish Cakes From Philippine Gobies

By H. E. ZIMMERMAN
Mt. Morris, Ill.

Cake made from smallest known fish

CAKES consisting of the goby fish of the Philippines and peppers or other spiced herbs are considered quite appetizing by those familiar with them. American soldiers during their periods of service in the Philippines became quite fond of this food and liberally patronized the small native restaurants where it was served.

Considering that rice and fish of every size and many varieties, prepared in every conceivable form, are the staple articles of food for most Filipinos, it is not as strange as it may seem that this goby is a food fish of considerable importance. These fish are believed to be the smallest known vertebrate in the world and the species from which these cakes are made is known by the scientific name *Mistichthys luzonensis,* Mistichthys consists of two Greek words which mean "smallest fish" and is used to designate the goby of the Philippines, whose average length is approximately one-half inch—the smallest size of any known mature fish. Their bodies are almost transparent and, except for their comparatively large eyes, have no clearly visible features. They deposit their eggs in crevices or under objects.

In the native Bicol tongue they are called "Sinarapan." When dried in the sun on a leaf they are known as "badi." Fishermen catch them in a fine-mesh net, which is let down under a school of them, and put them into tightly woven baskets from which the water soon drains, leaving a compact mass of fish.

So eager are the natives to buy this species that when the little fleet of fishermen return from their morning's quest and place their baskets upon the ground in the marketplace, they are at once surrounded by a crowd of anxiously waiting children. These young shoppers are supplied with every sort of dish in which to take home the family meal.

The media of exchange for about a pint of fish are three or four potato tubers, a handful or two of rice, or a few copper pennies.

The chilling and storage room at the plant of Leo Schloss, Inc., Newark, N. J.

Only the forequarters of cattle and lambs can be Kosher; moreover, chilling time must be kept at a minimum. These factors complicate refrigeration problems, make a flexible system highly necessary

How a Kosher Abattoir Solved Its Chilling Problem

THE large, centralized packing house, with its specialized refrigeration requirements for chilling, storage, curing, and byproduct processing, has received most of the attention given to refrigeration problems in the meat-packing industry in recent years. The local abattoir, often superficially regarded as a hold-over from an older system of distribution, has had to face the difficulty that these improvements were so specific in purpose. Consequently, they were not particularly practical for the refrigeration needs of plants where methods of operation were necessarily less highly specialized, and flexibility and adaptability highly necessary.

But the volume of meat slaughtered in local abattoirs is still enormous. A large proportion of the 600,000 tons of livestock that enters the New York area is effected by requirements entirely non-economic in origin that confine operations to a flexible and less specialized scale. The market for kosher meat, for example, which must leave the plant within a day or two if it is to conform to the dietary laws of orthodox Hebrews, takes about 150,000,000 lb. a year of cattle, veal, and lamb in New York City alone. Moreover, since these dietary laws stipulate that only the forequarters of the animal can be kosher, the problem of supplying this demand is complicated by the fact that only about 50 per cent of the weight of any carcass can go to this market.

The remainder, being sold as non-kosher meat, is not subject to the strict time limitations. It can, if necessary, be held in storage for longer periods. It is quite widely recognized that the kosher trade in the New York area takes a big percentage of the best heavy cattle and of the light choice cattle.

The plant of Leo Schloss, Inc., at Newark, N. J., is one of the prominent units preparing kosher beef, veal, and lamb for this market. The primary factor in the operation of the plant is that most of the kosher meat must leave the plant within eighteen hours after slaughtering takes place. In fact, a large proportion of kosher cuts must be shipped just as soon as body heat can be removed. As high as 95,000 lb. of meat a day is turned out, including kosher and non-kosher cuts.

The plant, built in 1923, contains one large cooler (about 90,000 cu.ft.) with a maximum capacity of about 250,000 lb. The operation of this box as a chilling room for heavy cattle, veal and lamb, as well as a storage cooler for the non-kosher cuts that need not be shipped out immediately, made the refrigeration problem a complicated one.

The original installation had overhead bunker coils to provide the refrigeration necessary, but the method was not particularly satisfactory for the double service—chilling and storage—to which it was subjected. The moisture given off by the freshly killed cattle made defrosting of the coils frequent and difficult. An installation of the overhead brine-spray system, commonly used in chilling rooms, was also not considered desirable in a room that, for about half the time, operated as a straight storage cooler.

When the plant was turning out a big production, the refrigeration was not sufficient to bring all of the product from body heat down to the 38 deg. F. level as rapidly as was desired. Moreover, excessive moisture in the box during the chilling condensed on walls and carcasses and made drip from the ceiling and ducts a major problem. Particularly for the non-kosher meat that was not to leave the cooler immediately, the excessive moisture was highly objectionable.

The most obvious method of solving the problem, of course, would be to have separate prechilling and storage rooms. However, as there is no slaughtering on alternate days, this would have meant that a room solely for chilling would have to bear double overhead costs. Moreover, the amount of handling necessary would have been raised in shifting chilled meat from one room to the other, possibly for only a short time.

The most desirable solution, it appeared, was to install a refrigeration system flexible enough to provide rapid chilling, which would at the same time keep humidity well below the saturation point. Moreover, it was highly desirable that on alternate days, when chilling was complete, the unit operate efficiently in holding the room at constant temperature and humidity for storage

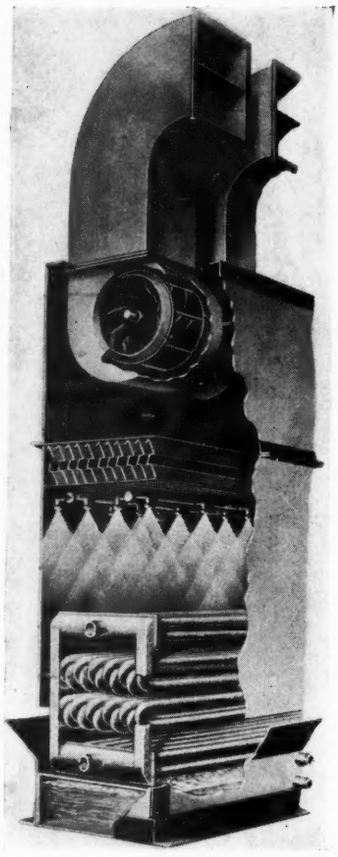
purposes. Obviously, it was also desirable that this be done without completely scrapping the refrigerating equipment then operating, and without any extensive alterations that would delay plant operations for any considerable period.

The system then in operation at the plant involved the use of two 6x6-in. compressors driven by 30-hp. motors operating at about 300 r.p.m. at zero gage suction and having a capacity of five tons apiece. Operating without back pressure, it was necessary to keep both machines in operation 24 hours a day, and even then the temperature and humidity conditions were far from ideal.

After a study of requirements of the cooler, it was decided to install two "Carrier B-K" cold diffusers providing forced air circulation of approximately 18,000 c.f.m. About 30 gal. of brine per minute is circulated through the diffusers, with a drop of about 3 deg. in the units.

Incidentally, it was found that by raising the back pressure in the ammonia system to 15 lb. gage, and maintaining the machine speed, it was possible to raise the refrigerating capacity of the system to a point where one machine was ample to operate the diffusers satisfactorily.

Because of the large quantities of moisture given off by the freshly killed meat, the cold diffusers were of the brine-spray type. In other words, an independent brine supply in each diffuser is sprayed over the coils to prevent necessity for defrosting. As shown in the cross-section view, stainless steel baffles take the moist brine particles from the air as it is drawn upward by the multi-blade centrifugal fans.



A cross-section view of the type of cold diffuser that was found desirable

The installation has brought about more favorable conditions in the cooler in practically every respect. In the first place, chilling is now sufficiently rapid to bring the meat temperature down to the desired point within the kosher time limitations, even on days of maximum production. But maintenance of the relative humidity at 90 per cent is perhaps the outstanding feature.

The objection often raised to forced-air coolers, that the air motion tends to dry out the meat, has not been found true for non-kosher cuts stored two weeks in the room. Proper arrangement of the air outlets and ducts at the ceiling of the cooler distributes the air circulation so that no strong drafts are brought to bear on the product in the cooler.

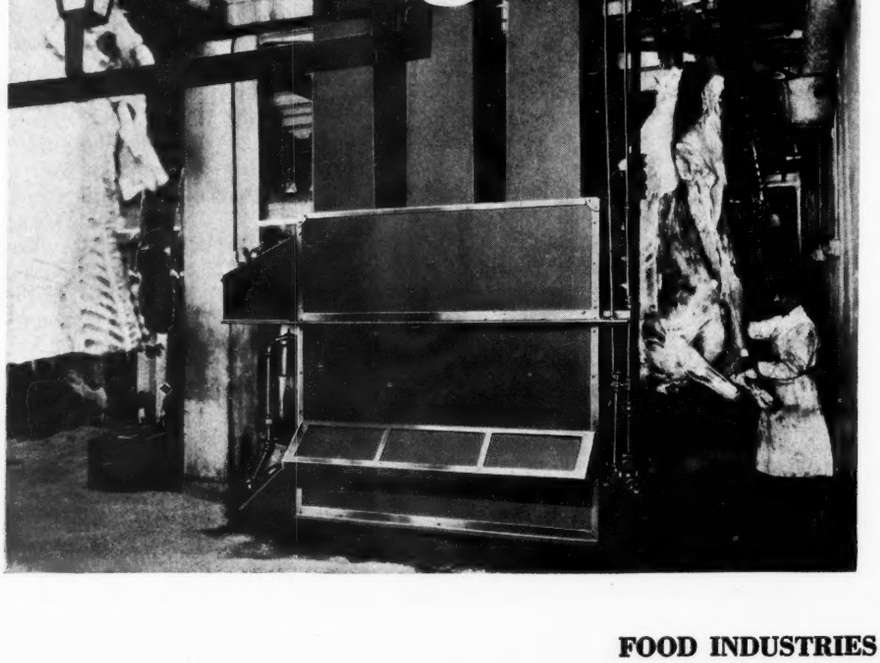
▼ ▼

Nut Margarine Makers Seek a Refund

Margarine manufacturers may be able to establish their claim to a refund of approximately $1,000,000 in taxes under a recent decision of the U. S. Supreme Court that prior to enactment of the Haugen amendment last August, the so-called "nut margarine" was not taxable. The court construed the law of 1886 as not applicable to products composed of vegetable oils. The Bureau of Internal Revenue has not yet decided what position it will take on reparation, but the manufacturers construe the court's decision as entitling them to a refund of all taxes paid during a 3½ year period prior to Aug. 1, 1931, when the Haugen amendment put the tax on all products made in semblance of butter. The period of reparation is limited by the statute of limitations.

Cold diffuser installed at the Leo Schloss cooler, showing the ducts that provide adequate air circulation without drafts

Courtesy, Brunswick-Kroeschell Co.



Minerals in Water Cause Variations in Product Quality

By STROUD JORDAN
Director, Applied Sugar Laboratories, Inc.
New York, N. Y.

IT HAS been largely within the past 25 years that the importance played by water in the manufacture of foodstuffs has been realized. Early in this period, a large baking company learned that certain bakeries were able to obtain results in the baking of bread which other bakeries, using the same formula, did not obtain. The solution of the problem showed that water varied in the locations and that the mineral content of the water had a direct bearing on results. This cause and effect of small percentages of mineral salts is now so generally recognized that mixtures of them have been made to correct conditions where water is unsatisfactory.

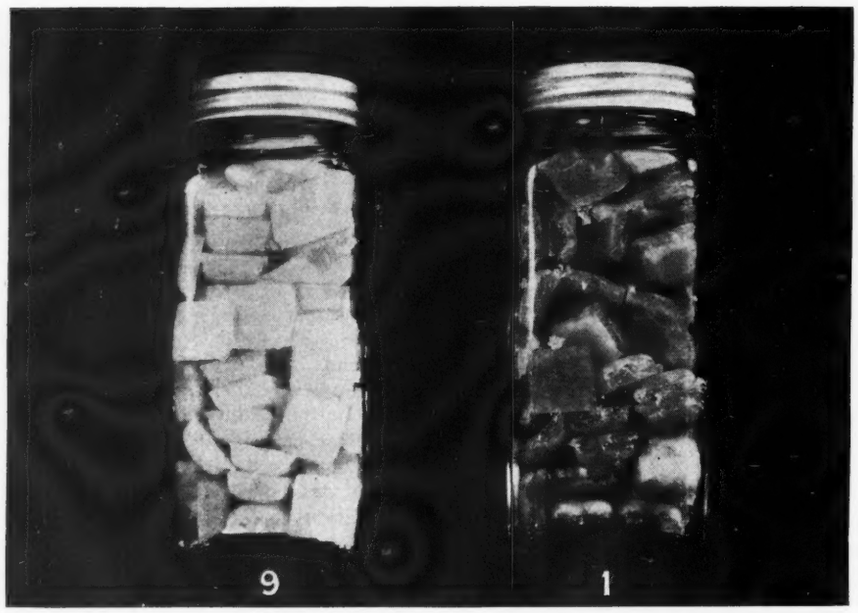
The case just cited is analogous to the story of a very famous ale. It was asserted that this ale could not be brewed except in the particular location of the original plant, a condition which was later found to be due to the composition of water used. The production of ale and baking of bread are not so far apart, since they each depend in a large measure on fermentation of carbohydrates. Also the activity of yeast in each is materially affected when certain mineral salts are added to the solution in which it is growing.

Stepping aside for a moment into other fields, we find in the textile industry, where it is necessary to produce clear and brilliant colors, that water plays an ever increasingly important part. In the manufacture of paper, it has also been found that the water supply must be subject to close control at all times. In the canning industry, composition of water used in the process must be standard and acceptable. A water softening plant, in connection with pea canneries, is almost a necessity.

Illustrations of this type might be furnished from almost every field of manufacture. Hence it is exceedingly strange that the confectionery industry should have paid so little attention to the variation in composition of waters used in the production of similar confections over different areas in the United States. Many faults, originally laid to sugar, corn syrup, starch, gelatine, albumen, and, in fact to every imaginable ingredient which is used, have

Table I—Water From 100 Cities

City	Calcium Oxide	Magnesium Oxide	Sodium and Potassium	Bicarbonates	Chlorides	Sulphates
Altoona, Pa.	.....	.....	.....	.....	4.5	.....
Atlanta, Ga.	11.4	0.7	Trace	10.0	3.6	10.8
Baltimore, Md.	19.0	7.0	4.7	47.0	5.1	14.0
Bedford, Pa.	9.0	.....	.....	.....	1.0	.....
Bloomington, Ill.	22.2	11.0	20.3	.....	3.0	52.2
Boise, Idaho	16.8	3.8	5.4	91.0	5.0	8.5
Boston, Mass.	4.2	1.1	2.0	7.0	2.1	6.0
Bridgeport, Conn.	6.0	1.3	8.9	16.0	3.5	7.1
Brockton, Mass.	3.1	1.8	7.5	.....	3.0	2.5
Brooklyn, N. Y.	.....	.....	.....	.....	20.0	.....
Buffalo, N. Y.	.....	Trace	13.0	.....	.....	.....
Burlington, Iowa	65.9	10.0	20.0	86.0	10.0	.....
Burlington, Vt.	10.0	5.0	7.8	57.0	1.2	7.4
Butte, Mont.	21.0	6.4	Trace	48.0	2.8	10.0
Cambridge, Mass.	.....	.....	.....	.....	7.0	.....
Canajoharie, N. Y.	54.1	10.5	3.1	137.9	3.8	9.0
Cedar Rapids, Iowa	18.0	13.0	.....	35.0	15.5	.....
Charleston, S. C.	18.0	1.7	3.9	22.0	9.0	20.0
Charlotte, N. C.	18.0	3.6	3.0	16.0	1.5	23.0
Cheyenne, Wyo.	36.0	6.4	7.3	86.0	3.8	18.0
Chicago, Ill.	45.3	18.2	3.2	.....	4.4	17.4
Cincinnati, Ohio	46.0	7.5	.....	.....	20.0	61.0
Cleveland, Ohio	47.0	14.1	.....	.....	15.0	25.3
Clinton, Iowa	90.4	47.3	56.8	122.6	34.6	22.0
Columbus, Ga.	8.4	1.2	10.2	15.3	4.0	13.0
Dallas, Tex.	31.7	3.5	13.5	.....	9.5	37.1
Dayton, Ohio	121.0	58.8	11.6	342.0	9.0	64.0
Denver, Colo.	37.5	19.1	16.0	87.8	30.0	41.8
Des Moines, Iowa	117.0	48.0	7.4	222.0	7.5	157.0
Detroit, Mich.	36.4	11.8	2.7	77.4	5.5	10.7
Fargo, N. D.	66.0	56.0	32.0	261.0	6.0	83.0
Fond du Lac, Wis.	.....	.....	.....	.....	60.0	.....
Fort Smith, Ark.	35.0	6.5	.....	.....	9.0	65.0
Fort Wayne, Ind.	.....	.....	.....	.....	34.0	.....
Fort Worth, Tex.	51.0	9.8	13.2	120.8	14.0	17.8
Grand Rapids, Mich.	38.4	19.4	3.4	.....	8.0	54.1
Greenwich, Conn.	.....	.....	.....	.....	6.0	.....
Hammond, Ind.	.....	.....	.....	.....	6.0	.....
Harrisburg, Pa.	18.7	4.7	9.0	.....	5.2	22.3
Hershey, Pa.	.....	.....	.....	.....	2.0	.....
Hutchinson, Kan.	103.0	25.0	119.7	.....	107.6	48.5
Indianapolis, Ind.	180.7	44.7	17.5	.....	20.0	58.0
Iola, Kan.	.....	.....	.....	11.0	180.0	.....
Jackson, Mich.	76.0	29.0	.....	.....	67.5	29.7
Jacksonville, Fla.	106.0	46.8	21.0	163.0	15.0	165.0
Johnson City, N. Y.	.....	.....	.....	.....	8.4	.....
Johnstown, Pa.	8.8	2.4	.....	.....	2.5	23.0
Kansas City, Kan.	83.0	31.0	66.0	202.0	13.0	135.0
Kenosha, Wis.	51.0	17.0	9.1	144.0	6.0	10.0
LaCrosse, Wis.	93.0	47.8	10.3	.....	9.0	18.0
Lancaster, Pa.	.....	.....	.....	.....	.....	.....
Lima, Ohio	65.8	26.7	.....	94.0	23.0	123.0
Lincoln, Neb.	101.0	27.8	22.72	259.0	11.0	53.0
Little Rock, Ark.	73.0	23.0	216.0	148.0	203.0	93.0
London, Canada	103.5	30.5	8.0	.....	6.0	28.5
Los Angeles, Calif.	88.0	35.0	50.0	214.0	28.0	105.0
Louisville, Ky.	47.0	12.0	23.0	30.0	15.9	45.0
Lynchburg, Va.	3.5	0.6	5.75	8.3	1.9	15.1
Madison, Wis.	93.0	64.0	5.2	335.0	3.0	16.0
McKeesport, Pa.	54.2	11.9	.....	.....	14.0	134.0
Memphis, Tenn.	15.4	8.2	18.9	77.0	2.5	3.9
Meridian, Miss.	2.0	0.9	9.6	15.0	3.4	3.1
Milwaukee, Wis.	47.7	19.8	.....	.....	6.5	12.1
Minneapolis, Minn.	56.4	24.4	6.4	167.1	2.9	30.9
Montreal, Canada	60.0	2.0	.....	.....	7.0	5.0
Newark, N. J.	13.9	5.3	.....	.....	4.0	13.9
New Haven, Conn.	6.9	2.7	2.0	15.0	3.4	7.6
New Orleans, La.	20.0	5.0	20.0	50.0	9.6	25.0
New York, N. Y.	18.2	6.6	1.9	8.0	1.2	2.0
Norfolk, Va.	12.0	7.0	36.0	24.0	26.0	31.0
Oakland, Calif.	18.9	6.4	17.1	61.0	10.0	13.4
Oklahoma City, Okla.	64.0	9.0	44.0	140.0	42.0	32.0
Omaha, Neb.	85.4	31.5	78.9	179.7	12.9	186.1
Ottumwa, Iowa	.....	.....	.....	.....	.....	.....
Owosso, Mich.	156.0	63.7	25.0	353.0	18.0	156.8
Philadelphia, Pa.	16.0	8.0	.....	.....	4.0	24.0
Phoenix, Ariz.	71.0	35.0	48.0	266.0	29.0	27.0
Pittsburgh, Pa.	22.5	6.0	19.0	9.0	7.0	52.5
Pocatello, Idaho	105.0	58.0	164.7	318.9	116.0	98.7
Portland, Ore.	2.8	1.2	2.5	12.8	2.4	.....
Poughkeepsie, N. Y.	40.6	3.3	.....	.....	11.5	7.0
Providence, R. I.	7.2	0.66	.....	5.1	.....	7.7
Reading, Pa.	.....	.....	.....	.....	2.5	16.0
Rochester, N. Y.	33.0	9.9	5.0	75.6	6.0	22.2
St. Louis, Mo.	30.8	15.0	28.0	38.0	14.0	88.6
St. Paul, Minn.	51.0	25.3	3.9	.....	3.9	17.0
Salt Lake City, Utah	76.9	14.8	11.01	224.0	17.0	57.0
San Antonio, Tex.	86.5	23.2	6.9	245.0	17.0	14.0
San Diego, Calif.	53.2	16.6	53.0	202.0	48.0	19.0
San Francisco, Calif.	40.4	20.4	12.0	.....	21.3	19.2
Seattle, Wash.	10.1	1.6	1.8	.....	1.6	0.7
Sioux Falls, S. D.	148.05	58.0	7.0	.....	6.3	158.9
Spokane, Wash.	.....	.....	.....	.....	2.7	.....
Springfield, Mass.	4.8	.....	.....	.....	.....	8.6
Syracuse, N. Y.	44.4	9.8	2.5	106.0	1.7	12.1
Toronto, Canada	50.2	12.9	10.5	.....	13.0	21.8
Trinidad, Colo.	18.0	1.4	19.0	.....	.....	.....
Tulsa, Okla.	42.0	2.2	6.33	93.0	4.5	7.5
Winona, Minn.	75.8	35.3	.....	90.0	63.0	59.9
York, Pa.	9.5	5.3	1.9	15.0	4.0	11.0



Showing effects of waters Nos. 1 and 9 on color of all-sugar hard candy

been due in some measure to the composition of water employed.

Interest was aroused in the rôle played by water in the production of hard candies about six years ago. At that time attempts were made to gather definite information regarding composition and to apply such information to experiments which would show whether some of the difficulties encountered were not due to changes in the water composition. The investigators found that little or nothing was known concerning the water supplies generally used in the confectionery plants. Consequently the information obtained was of necessity gathered slowly through the assistance of private laboratories, government bureaus, and city water departments. A few selected waters were tried out and the results obtained were astonishing. These results led to a further investigation which was carried on during 1930 at the request of the National Confectioners' Association.

Information was obtained from representative confectioners, from water departments in cities where plants were in operation and from various other available sources. In this manner it has been possible to compile data covering one hundred cities located throughout the United States and Canada. In many cases a full report was not available because many of the questions asked could not be answered. However, a comparison of results received will be of interest, and in Table I such data as is available is given. In reviewing this table, one must remember that no water supply is uniform. Different seasons of the year show a supply with varying quantities of mineral and organic matter. Further than this, methods of analysis have varied and styles of reporting are different. While the available results have been unified so that they are comparable, the percentage composition of these waters has not been checked personally.

Examination of Table I shows that the solid matter has varied from less than twenty to almost eight hundred parts per million as an average. There are waters which show as much as two thousand parts per million. Another interesting fact is that the sodium chloride content of certain waters runs high, particularly in dry seasons. Because it has been impossible to gather authentic samples from each of the hundred different waters with which to try out the production of different types of confections, a study was made of the variation in their composition and twelve representative waters were produced artificially. The composition of these waters is given in Table II.

These twelve representative samples of water were used to produce cooks of hard candy, using the same sugar in every case, in order that the effect of water on color and inversion could be determined. Three distinct types of hard candy samples were made. In the first set of experiments no inverting agent was used to prevent graining, nor was any other material added to offset such a condition. Only sucrose (granulated sugar) and water were employed, and after a solution was obtained, the boiling was continued to 335 deg. F. This was done for two reasons: the first being that it was desired to obtain definite information on the effect of boiling sucrose with each type of water, and the other being that, when samples had grained, practically the same effect would be demonstrated as if extra cooks of fondant were made. Cooking conditions were the same in each case, but by referring to Table III it will be found that color in the highest, when compared with a standard white sugar solution, was approximately four and one-half times as great as that in the one which showed the least. Contrary to this, the clearest sample showed 3.7 per cent of inverted sugar, while in the one containing the most color, only 1.3 per cent had been inverted. This difference is characteristic because the darkening was due to loss of carbon dioxide. Such loss changed bicarbonates into carbonates and made the resulting water distinctly alkaline. In the case of the least color, the sample was slightly acid.

The same twelve waters were used in a second set of experiments to produce a clear hard candy, free from grain, in which 80 parts of sugar and 20 parts of corn syrup were used. The cooks were made over a regulated open fire just as in the case of the first experiments, but these samples were finished at 315 deg. F., whereas the all-sugar samples were finished at 335 deg. Identically the same effect was found when color was determined, but the corn syrup and sugar samples remained clear and ungrained. These samples gave the appearance of being darker in color because light passed through them without interference. In the case of the grained all-sugar samples only a color produced by light reflection from the surface was obtained.

To determine buffering effect of the twelve types of water a standard solution of citric acid was made, so that 0.0125 per cent would be used in a standard solution composed of 50.0 per cent sugar and 50.0 per cent of each of the twelve waters. Each solution was placed in a flask and boiled slowly over a regulated flame. The water vapor was condensed and returned to the flask to keep the volumes constant. At the end of 30 minutes these samples were cooled down, loosely stoppered, and later tested for percentage of sugar

Table II—Special Waters Prepared by Applied Sugar Laboratories

	1	2	3	4	5	6	7	8	9	10	11	12
Calcium Oxide (CaO)...	235.3	124.8	32.2	293.3	98.0	55.6	19.0	51.3	.....	.....	6.3	4.2
Magnesium Oxide(MgO)	16.7	48.2	16.1	99.5	.....	25.0	6.6	.....	.....	.....	2.0	1.3
Sodium Oxide (Na_2O)...	31.8	6.6	7.2	493.9	.....	24.8	17.3	265.1	.....	.....	.....	1.8
Potassium Oxide (K_2O).	37.8	.....	.....	.....	.....	.....	.....	.....	.....	.....	2.3	2.3
Bicarbonates (HCO_3)....	.....	.....	.....	.....	179.5	.....	.....	.....	.....	.....	11.0	.....
Chlorides (Cl).....	36.4	7.5	8.2	71.0	81.6	21.2	10.3	303.3	.....	.....	1.0	2.1
Sulphates (SO_4).....	78.5	153.0	72.9	1243.1	88.4	29.6	13.6	70.6	.....	.....	7.7	5.5
Total Solids.....	600.0	393.4	132.0	2033.0	576.0	214.6	84.0	618.0	.....	.....	34.0	19.14
Total Hardness.....	.....	.....	.....	.....	269.0	.....	.....	.....	.....	.....	.....	.....
Temporary Hardness....	.....	.....	.....	.....	111.0	.....	.....	.....	.....	.....	.....	.....
Permanent Hardness....	.....	.....	.....	.....	158.0	.....	.....	.....	.....	.....	.....	.....
Alkalinity before boiling.	.....	.....	.....	.....	131.4	.....	.....	.....	.....	.....	.....	.....
Alkalinity after boiling.	.....	.....	.....	.....	20.7	.....	.....	.....	.....	.....	.....	.....
pH before boiling.....	5.91	5.41	5.3	5.4	6.97	5.23	5.42	4.91	6.16	7.76	6.92	5.32
pH after boiling.....	7.42	7.52	7.37	7.66	7.62	7.59	7.42	7.2	6.55	6.82	7.04	6.79

Table III—Inversion and Color Produced in Candy During Cooking

Special Waters	Invert Sugar Per Cent	Color	pH—50 Per Cent Solution
No. 1.....	2.15	4.35	6.46
No. 2.....	2.09	2.35	5.36
No. 3.....	2.22	1.63	5.20
No. 4.....	1.34	4.88	5.17
No. 5.....	1.38	2.47	5.31
No. 6.....	1.49	2.02	5.33
No. 7.....	1.63	2.04	5.17
No. 8.....	1.81	1.37	5.08
No. 9.....	3.64	1.00	5.24
No. 10.....	2.71	0.94	5.33
No. 11.....	2.06	0.72	5.33
No. 12.....	2.11	0.89	5.58

The above waters made up in the Applied Sugar Laboratories.

inverted. Further experiments, in each of which the quantity of acid was increased by 0.0125 per cent, were carried out. Results of these tests are to be found in Table IV.

If we examine these results, we will find that the first sample exerts an almost perfect buffering action even when four times the initial quantity of citric acid is used; that the second sample does not cause an appreciable increase in inversion until three times the initial quantity of acid is employed; that the third sample shows little buffering action; and that, while the invert sugar formed increases with the addition of larger quantities of acid, it probably will increase without such addition if the time used in boiling is prolonged.

Samples 4, 6, and 5—in the order given—show good buffering action in the beginning, but inversion increases with each subsequent increase of acid. Sample 7 permits of increased inversion and probably will allow complete inversion if the time factor is properly adjusted. Sample 8 shows little buffering action and is comparable to sample 3.

Interesting facts to be noted concerning waters Nos. 9, 10, 11, and 12 are that No. 9 is distilled water; that No. 10 is distilled water which has been filtered through precipitated chalk; and that Nos. 11 and 12 are types of water encountered on the Eastern seaboard of the United States. There is nothing to be gained by replacing samples Nos. 11 and 12 with distilled water, which will be found particularly true with supplies of both Boston and New York.

A thorough examination of the twelve samples easily explains why trouble occurs when the same confectionery products are made in different localities. Such trouble may be illustrated when a candy maker from the Eastern seaboard, accustomed to producing an all-sugar hard candy using 1½ oz. of cream of tartar in each 100 lb., attempts to produce the same product in the Middle West with a water supply which is hard. The batch will grain on the table before he has time to pull it. Prevention of grain may require more than twice the quantity of cream of tartar he had been accustomed to use with the softer water of the East.

Let us further illustrate the far-reaching effect of water by taking the case of a manufacturer located in a city where the supply is very hard and also contains more than the usual quantity of iron. Numerous complaints were made to manufacturers of all raw materials employed. Sugar, corn syrup, albumen, flavor, and colors each came in for its share of the blame. The appearance of the finished fondant was never satisfactory, although in some seasons it was better than in others. In desperation the manufacturer used so much sulphur dioxide that his product was inedible; still the color was unsatisfactory. Samples of all raw materials except water were examined; the trouble was not located. The confectioner was notified of results, but this did not satisfy him. He was requested to furnish larger samples of the sugar products which were giving him trouble. These were used with soft waters and the resulting fondant was acceptable in every respect. The trouble was located when the water supply was examined. He was so notified. Request was made, at the same time, that he secure a sample of distilled water and produce a batch of fondant from the sugar products he had previously condemned. Results obtained were satisfactory, and the trouble, which had been with him intermittently for fifteen years, was definitely eliminated. This same fact may apply to other manufacturers.

It is not believed that manufacturers fully realize to what extent the mineral content of waters enters into the composition of finished confections. If reported sales during 1930 be taken as a basis for computation and the quantity of water used in the production of such a quantity be estimated, it will be found that approximately twenty tons of mineral matter has found its way into confectionery from water supplies alone. This is quite an interesting figure and one which should set every manufacturer to thinking.

It is not possible to say just how much mineral matter in water is objectionable, in so far as confectionery manufacture is concerned. The type of mineral matter rather than the actual quantities must be known first. If all pertinent factors are considered, one will find that approximately 50 per cent of the water supplies examined are satisfactory, provided tanks used for storage and pipes for distribution are kept in good condition. An additional 25 per cent may be used, but with questionable results if they are not satisfactorily purified. Five per cent of the waters examined *must* be treated before use. Twenty per cent of all supplies examined are unsuitable.

The condition of a finished product depends upon the purity of each raw material employed in its manufacture. This applies to water just as much as to sugar, corn syrup, albumen, gelatine, or any of the other commonly used raw

Table IV—Buffer Effect of Mineral Content of Waters

Special Water Samples	Per Cent of Invert Sugar Produced Test 1	Test 2	Test 3	Test 4
No. 1.....	0.40	0.44	0.40	0.44
No. 2.....	0.45	0.50	8.54	21.44
No. 3.....	28.74	64.52	75.12	86.65
No. 4.....	0.32	1.18	14.88	27.48
No. 5.....	0.32	5.80	25.04	44.35
No. 6.....	0.30	2.91	16.88	35.90
No. 7.....	7.60	38.60	64.10	69.35
No. 8.....	33.92	65.65	79.05	88.35
No. 9.....	68.92	88.90	92.90	93.20
No. 10.....	50.08	76.10	86.00	90.40
No. 11.....	51.84	77.85	89.25	87.60
No. 12.....	65.24	77.65	88.95	91.15

Test 1—0.0125 per cent citric acid to 50 grams sucrose.
Test 2—0.0250 per cent citric acid to 50 grams sucrose.
Test 3—0.0375 per cent citric acid to 50 grams sucrose.
Test 4—0.050 per cent citric acid to 50 grams sucrose.

materials. Just because manufacturers in the past have assumed a water supply to be suitable does not mean that it is or that it will remain so. It is, therefore, strongly recommended that each manufacturer familiarize himself with his water supply and gather all available information as to its composition, for by so doing many of his so-called major troubles may be eliminated.

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Molasses Valuable As Fertilizer

INTENSIVE experiments are being carried on by the Hawaiian Sugar Planters' Association looking to the disposal of a part of the 250,000 tons of molasses produced annually by the manufacture of Hawaiian raw sugar. The market hitherto enjoyed for this molasses has largely disappeared, until the industry is faced with the problem of disposing of about 90 per cent of the annual production. It contains on an average about 4.5 per cent of potash as K_2O and somewhat less than 1 per cent of nitrogen. Its percentage of organic humates is very high.

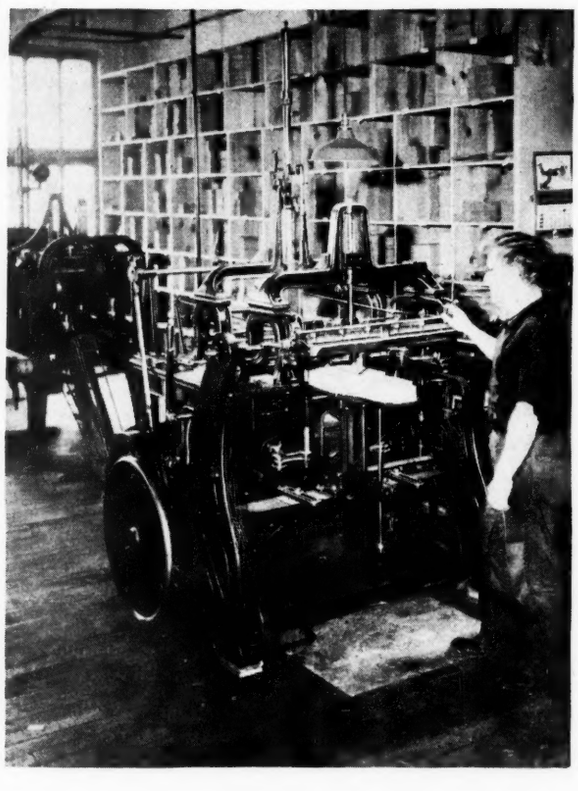
Partly to render the fertilizing constituents available but mainly to make a portable mixture of the very heavy, viscous molasses, it is subjected to a charring process with sulphuric acid, followed by the addition of basic crude fertilizers which, together with mill ash, result in the formation of a dry, granular and readily handled product. Experimental research on the fertilizer has been transferred from the laboratory of chemistry to a plantation factory where, at the present time, several types of mixtures are being prepared on a semi-plantation basis.

Soil pot tests carried out at the experiment station have shown extremely gratifying results. One observation points to the possibility that the undefined humic constituents of molasses give the mixture a value to the plant not to be obtained by the employment of any commercial inorganic fertilizer when used on the same basis of plant food content.

Coordinated Operations Give Low Packing Costs

By F. H. LAVERY
Treasurer, Young & Griffin Coffee Co.
Brooklyn, N. Y.

Fig. 1—Brightwood carton maker with interlining machine in background



PACKAGING of coffee in a wholesale coffee-roasting plant presents many varied and troublesome problems. Filling and sealing of the more bulky containers present very little difficulty, as the operation consists merely of placing the tared container on a scale directly under the chute of the supply bin suspended from above. By means of a slide valve in the chute or hopper, the desired quantity of coffee is run into the container. The filled container is replaced by an empty one and closed by another operator while the filling operations proceed, or is set aside until after the filling operations are complete.

On the other hand, packaging in 1-lb. containers for the present-day market is far from being such a simple operation; even as simple as it was only a few years ago. Then the coffee roaster and packer, like nearly every other producer of packaged food products, as far as the package itself was concerned, had only to concern himself with the sanitary appearance of his package and the matter of giving full weight. The buying public had not been made so trademark conscious nor was there such a variety of packages competing by size, design, or some other distinctive feature to attract the consumer's attention. In fact, packing coffee in 1-lb. packages was then as much of the retailer's merchandising function as of the roaster's. The more general practice was for the retailer to buy in bulk and do his own packing during the slack periods of the day when his clerks otherwise would be idle. At that time the coffee grinder had not entirely disappeared from the home, and the consumer had his individual ideas about how the coffee should be ground. Consequently even packaged coffee was ground coarsely or not at all by the roaster. The retailer did the final grinding according to the wish of the consumer.

With the changing of consumer buying habits and the steadily increasing demand for packaged ground coffee, grinding and packaging became a centralized merchandising function. As might be expected, the bulk of this centralized grinding and packaging found its way into the plants of the roasters who had been supplying the retailers with their unground bulk coffee. These operations were added as an aftermath and in a haphazard manner to the roasting and bulk handling operations. In the main the first packages were 1-lb. paper bags, filled by hand, and closed by folding or rolling the top before being tied or sealed.

In this way the Young & Griffin Coffee Co. first entered the packaged coffee business. Before modernizing its plant and operations its packaging was being done by sixteen girls at the rate of 35 1-lb. bags each per hour and at a cost of $800 per month.

In more recent years the situation has become so involved that the coffee roaster, whether he packs and merchandises under his own trademark, does wholesale roasting for private label distributors or performs both functions, is compelled by economic restrictions to choose a market in which he can find an outlet for the capacity of his plant and pack accordingly.

Although the Young & Griffin Coffee Co. has a trademarked blend, which it packs in a lithographed drum-head-sealed, lock-top tin can, private label packages make up the greater part of its annual output of 8,000,000 lb. To attract this volume of business, old-time methods of filling and packaging had to be replaced by a low-cost method involving highly mechanized operations.

This mechanization includes the making and preparing of the container for filling as well as actually weighing the coffee into the package and subsequently sealing and wrapping the package. Only by standardizing on a container of definite size, shape, and construction can a roaster with 1,000 to 1,500 private-label

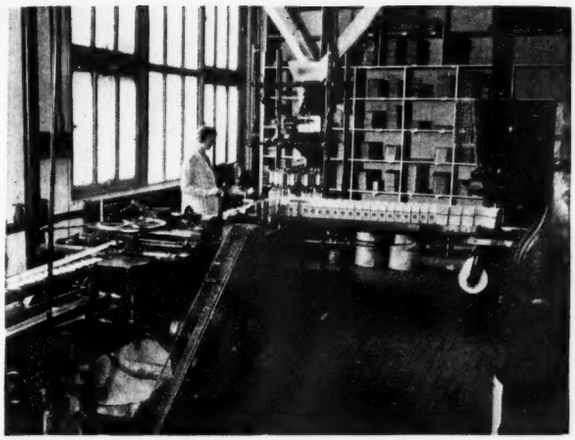


Fig. 2 — Showing hook-up between interliner, filler, and top sealer

distributors hope to cope with the problem of keeping his packing costs down to the minimum.

Blanks for these 1-lb. boxes, $6\frac{1}{2}$x4x$2\frac{3}{4}$ in., are purchased in large quantities from the concerns specializing in cutting and scoring forms for cardboard boxes. For the distributors that buy coffee in large quantities or at regular intervals until a definite contracted amount is taken out, these blanks are printed complete by the concern making the blanks. For the distributor who buys in smaller quantities and less regularly only the standard designs are printed on the blanks at the time they are made. The additional printing is done in lots by a convenient job printer just previous to the filling of the order.

By this procedure quantity prices can be obtained for the blanks, a box-making machine can be definitely adjusted to work automatically at a definite rate making the blanks into boxes, and losses to roasting company due to unused blanks are reduced to an almost negligible quantity.

When an order is to be filled or a ready-stock run is to be made, blanks of the proper label designation are loaded into the feeder compartment of a Brightwood box-forming machine which is connected in series by means of channeled conveyor belts with an interlining unit, a weighing and filling unit, a top sealer, and a wax-paper wrapping machine.

In operation the scored blank feeds into the box forming machine where a block-type of plunger strikes the blank on the solid-bottom section and forces it into a form where the freshly glued edges are pressed together by a pressure of 500 lb. per sq.in. and held sufficiently long to form a carton open at the top only. This newly formed box is discharged onto a conveyor belt having the same width as the box and channeled between supporting walls to keep the freshly glued surfaces fully in contact with each other. From this conveyor the box feeds into a second Brightwood machine which forms, from a roll of paper, and seals an open-top boxlike vegetable parchment paper interliner and automatically inserts it into the cardboard box as the box passes through the machine to another conveyor, which in truth is a continuation of the first. As this conveyor carries the lined box in a vertical position to a point tangent to the path of the rotating table of the filling machine, a finger-like projection turns the box through a 90-deg. arc. At the point tangent to the rotating table a plunger type mechanism, operated on the cam principle through the same plane but at right angles to the belt conveyor, pushes the lined box into an empty compartment on the table of the filler.

When the box reaches a predetermined point in the path of the rotating table it passes under the hopper of the filling machine into which has been net-weighted, from a supply bin above, the quantity of coffee the box is to receive. As the box reaches the point exactly under this hopper its progress is momentarily halted, an automatical weigher of the Scott type releases the weighed coffee into the box. By trip action the hopper is closed and a new charge of coffee is weighed into the hopper as the filled box moves on and is discharged onto a conveyor moving at right angles to the conveyor that fed the box to the filling machine. This belt delivers the filled box into a unit which interfolds the interliner with the flaps of the box top and top-seals the box so that it is sift-tight. Through this unit, under a constant pressure on its top, the sealed box moves in a continuous manner to a conveyor that delivers it to the wax-paper wrapping unit. In this unit the box is completely wrapped and heat-sealed in a highly transparent hard wax paper. Wax paper of this type not only gives good visibility to the printing on the box; it also precludes gumming up of the wrapping machine and disfiguring of the wrapped package with wax softened by summer heat.

When delivered from this wrapping machine the finished packages are packed into shipping containers and made ready to deliver to the distributor-customer.

Throughout this installation each machine is driven by an individual slip-ring induction type motor of 1-hp. capacity and all units are coordinated to operate at the rate of 33 1-lb. packages per minute. The whole installation requires the services of one man operator and two girl packers. In this manner a production of 1,800 lb. per hour is obtained in contrast with an output by the old method of 560 lb. per hour with 16 girls and one man operator. Furthermore, the old, loosely closed bags had little of the product-protecting and consumer-attracting features of the present-day tightly sealed wax-paper covered box.

Coordination of these units is obtained by adjusting the motors to the same r.p.m. and making the pulleys of the same diameter. By making the necessary pulley changes the production of these units can be stepped up to 35 packages per minute. The limiting unit is the weighing and filling machine, which requires an interval of not less than 25 seconds between weighings for accurate work.

On a separate unit the Franco-American trademarked blend is filled into the drum-head sealed, lock-top tin cans into which the bottoms are crimp-sealed after the cans are filled.

It is significant of careful planning for low-cost operation that these filling and packaging installations are only parts of an engineer-designed and laid out modern plant for the roasting, blending, grinding, and packaging of coffee for the present-day highly competitive markets.

Fig. 3—Illustrating relation of wax-paper wrapping machine to filler and top sealer

Sharpshooting for Increased Milk Consumption

How shall the milk dealer increase his sales? By general advertising in newspapers; on billboards; with radio programs? This method is becoming increasingly wasteful, Dr. Howe feels. Its chief result is to shift present consumers between competitors. Surveys indicate that cooperative educational work through personal contact in specific fields offers a far sounder basis for a real increase in consumption, and in sales.

By CHARLES B. HOWE*
Senior Economic Expert
Federal Farm Board
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THIS is an age of mass appeal. In seeking increased sales, dairy companies have generally concentrated on a policy of broadside attack. Appeals have been directed to the entire number of families in the community, with the feeling that, if only the message can be brought to all, the task will be well done. The recent entrance of a dairy company into the nation-wide broadcasting field serves to dramatize the dependence upon mass appeal. It involves an enormous stepping up of its scope, and probably of expense, but the principle is an old one.

For example, a fluid milk distributor desiring to push his Grade A milk sales buys space in the newspapers, shouts his claims from billboards and car ads, plasters his wagons with attractive posters, and the like, with the thought that every person who reads is a potential consumer. He ordinarily does not stop to analyze the fact that every family is not a potential consumer, and that the consumptive capacities of families who do consume vary widely.

As the past decade of accelerating prosperity brought with it an increased per capita consumption of milk, there was no incentive to question seriously the effectiveness of existing methods; it was inevitable that the growth in business should be attributed to the prevailing methods of building sales. As a matter of fact, they probably had little to do with it. We believe that the tremendous expenditure of money and effort upon sales promotion activities has been largely effective in taking customers away from competitors rather than in building new trade.

Current news reports a further massing of heavy advertising artillery along a nation-wide front—to lay down an overwhelming barrage with the confident feeling that some shots will hit the mark. The principal accomplishment of all of this is to step up on a scale not known before to the dairy industry, the play of that old game, "Button! Button! Who's got the button?" with the customer playing the rôle of the button. Though the game of filching customers can be played by all, unquestionably the advantage rests with the organization whose resources permit it to be most vocal. In the past, competition has been between rather unevenly matched contestants. But now the process of concentration in most metropolitan markets has gone far enough to make the struggle of more formidable proportions. Net increases in volume obtained at the expense of a competitor will be obtained with increased cost.

Because of the tremendous expense and the diminishing accomplishment of the mass sales promotion efforts, the advisability of continuing blindly down the beaten path is increasingly questioned. The more strenuous competition of the future makes more attractive the building of consumption by means which do not require an assault upon the patrons of one's competitor.

Raising the general levels of consumption is a long, slow process, but it is one upon which the net progress of the dairy industry finally rests. Certainly, if it is to be economically successful, much more discriminating methods of attack must be adopted. If there are fundamental differences in the milk consumption habits of families these should be recognized. Sales efforts must be focused upon the families whose consumption can be increased. It is in this connection that the findings of recent studies of the consumption of dairy products become valuable.

The first of these studies of consumption pointed out that fluctuations in sales are of a seasonal character, occurring and recurring year after year with considerable regularity. They also disclosed the nature and magnitude of the fluctuations occurring on different days of the week. But what is more pertinent at this time was the disclosure of a very pronounced regional contrast in the sales per family. While temporal changes brought a maximum average fluctuation in the sales of retail milk of 10 to 20 per cent, the sales per family in different sections of the city varied as much as 50 per cent.

In almost every large city, some localities are occupied almost exclusively

*The survey upon which this interpretation by Dr. Howe has largely been based was conducted by the New Jersey State Experiment Station in cooperation with the Bureau of Agricultural Economics of the U. S. Department of Agriculture. An associate economist in the former organization, Dr. Howe is now serving the Federal Farm Board on a leave of absence from the New Jersey body. The interpretation consists of the personal conclusions of the author—it represents no official stand.

by a particular group, such as Negroes or Italians, while others consist of a certain combination of races or nationalities such as Jews and Irish. In estimating daily requirements, both as a total and by individual routes, it is very important for the metropolitan dealer to know the milk consumption habits of each of the races or nationalities that he serves.

In general, investigations have shown that racial or nationality characteristics which introduce essential variations in the per capita rates of consumption are confined to three groups: Irish, Negro, and Italian. The Irish consistently report a per capita consumption of possibly 5 per cent in excess of that of native whites. On the other hand, the per capita consumption of Negroes and Italians is very much less; in the case of the Italians it is 30 to 40 per cent less than that of native whites, and Negroes consume only about half as much milk as native whites.

Perhaps the most pronounced racial or nationality preference appears in the case of Negroes. Because only about one out of three Negro families uses any fluid milk whatsoever, and this in very small quantities, it may be concluded that Negroes do not like sweet milk. But they do like buttermilk, and generally it is substituted for sweet milk in their diet. The small per capita sales of fluid milk in Negro districts thus is grounded on so fundamental a preference that few results will follow the usual sales efforts of dealers. Why continue attempts to increase the sales of sweet milk to a group which really prefers sour milk products? Certainly this is one group which remains utterly unaffected by a broadcast appeal for increased sweet milk consumption.

The case for increased milk consumption by Italian families is not so definitely adverse as that of the Negroes, and there is reason to believe that some of the efforts directed toward this group have been productive. It was found that first-generation Italian families (the parents of these are American-born children of Italian immigrants) consume about 30 per cent more milk per capita than do families in which the parents are foreign-born. While this increased consumption may be partly the result of persuasion, in considerable part it is due to changes in the composition and economic status of the family itself. The sales efforts which have been effective are not those receiving the most generous appropriations in the advertising budget. Rather they are the daily personal contacts with the school, the community center, the visiting nurse, and other agencies to whom the Italian family has learned it may turn for aid and wise counsel.

This increased consumption by Italian communities is the result of a more generous use per family and not of an increase in the number of consuming families. In fact, in the New York district about 95 out of every 100 Italian families used some milk, in which respect they did not differ from the native whites. Thus it appears that some permanent gains in the quantity of milk sold per capita are possible in the case of Italians—a specific market at which dealers can aim.

Perhaps an even more noticeable characteristic of a large city is the extreme difference in the economic welfare of people residing in various communities. But wide as these differences are, only in the groups with the very smallest per capita income is the rate of milk consumption affected. The average purchases of other income groups remain unchanged irrespective of the amount of money available.

In the New York market, for example, the average per capita level of 0.7 to 0.8 pint per day is maintained regardless of the height to which incomes rise. Apparently these families are purchasing all of the milk which they feel they now require—a fact indicative of the very high degree of sales resistance which exists among these groups. But when income falls to low levels, such a quantity of milk cannot be purchased and the families of the low income group can buy only from 80 to 90 per cent of the amount used by the other groups. The full importance of this disclosure does not appear until it is understood that the families with very low per capita incomes are those containing the largest number of children. Unquestionably the unsatisfied demands of these children constitute a market of tremendous possibilities, but the tapping of this can never be accomplished by advertisements in newspapers or a clever radio program. It awaits either the securing of more adequate incomes or the successful persuasion of the family by more personal methods to alter its present buying program to include more milk.

Latte che è sicuro e puro
NOI siamo orgogliosi del fatto che durante un periodo di molti anni, con un aumento continuo, noi abbiamo avuto la nostra parte nella nutrizione di quattro generazioni di bambini — Che oggi noi siamo "il lattaio" di più di 800,000 famiglie.
Voi potreste essere anche interessati nel sapere che un medico di fama nazionale che fu ospite recentemente in uno dei nostri impianti, disse:
"Vi sono altre latterie nella nazione che distribuiscono buon latte — ma certamente nessuna può fornire un latte migliore e più sicuro di Borden's.
Una telefonata ovvero un ordine a qualsiasi lattaio rivenditore di Borden's inizierà subito il servizio di Borden's.
BORDEN'S
Grade A Milk
BORDEN'S FARM PRODUCTS COMPANY, INC.
110 Hudson Street : : New York, N. Y.

Certain national groups, particularly the Italians, are fertile fields for promotional work. The advertisement is from a New York City Italian daily

Courtesy, Borden's Farm Products Co.—Louis Kram, Inc.

Though not so evident to the casual observer, families of different sections of a community differ also in their size and composition. For example, among apartment-house dwellers the average number of children per family is less than one. In contrast, the families in tenement districts are large; they very frequently contain more than three adults and usually three or more children. Size of family influences consumption primarily through the association with income.

The presence of children in the family is important because their milk consumption habits differ from those of adults. As a general rule, the presence of children in the family leads to a milk consumption 5 to 15 per cent greater than when it is composed only of adults. Furthermore, there is a definite tendency for consumption to increase as the number of children per family increases. Unfortunately, however, the limitations of income offset this tendency and per capita consump-

Courtesy, Philadelphia Inter-State Dairy Council

The flippant attitude of the high school age is used in this booklet to attract those who ordinarily give up milk as "something for kids." Field men use such material to back up educational work

tion undergoes successive declines when the family contains more than two children. The per capita consumption of families containing more than five children is actually less than that of families of adults alone. This means that though families with a large number of children are potentially heavy consumers of fluid milk, actually they are now consuming the maximum quantity which they feel their budget permits.

The age of the child is also related to the quantity of milk consumed. As children mature their consumption habits gradually come to resemble those of adults. The pressure of custom, which brings this about, is very pronounced and bears upon the child at a time when he is particularly sensitive to group suggestion. Other beverages besides milk are added to his menu. This substitution is speeded up by the tendency of the child to consider the use of coffee or tea an indication of attainment of full maturity. The extent of this readjustment is indicated by the fact that generally more than three-quarters of the children are milk drinkers, while among adults the proportion is less than a third. It may also be suggested by the fact that the per capita milk consumption of adults is 15 to 25 per cent less than that of children.

This review shows that differences in the rates of milk consumption reported are not haphazard occurrences but rather they result from definite influences which are instrumental in shaping and governing a family's consumption behavior. It indicates the error in the advertising policy which rests upon the assumption that these differences are quite irrational or that there is a similar rate of consumption to which all groups may be lifted. It reveals the unreasonableness of the supposition that broadcast appeals, irrespective of the medium used, will be influential in bringing about significant charges in per capita milk consumption.

We feel that the alternative lies in the initiation of sales efforts discriminating in their character and personally conveyed to carefully selected groups in the community. Our analysis suggests that the full force of this attack should be directed to children, and the most ready avenue of attack is through the schools. Although children at the present time are the heaviest consumers because they are the regular milk drinkers, only three-quarters of them drink milk. Why not take the steps which will increase this proportion? Milk served in the school—possibly without any charge to the child—is one way to accomplish this. Have no fear that this will decrease the consumption at home, because the evidence in the New York district shows that the milk drunk at school constitutes a net increase in the average per capita consumption.

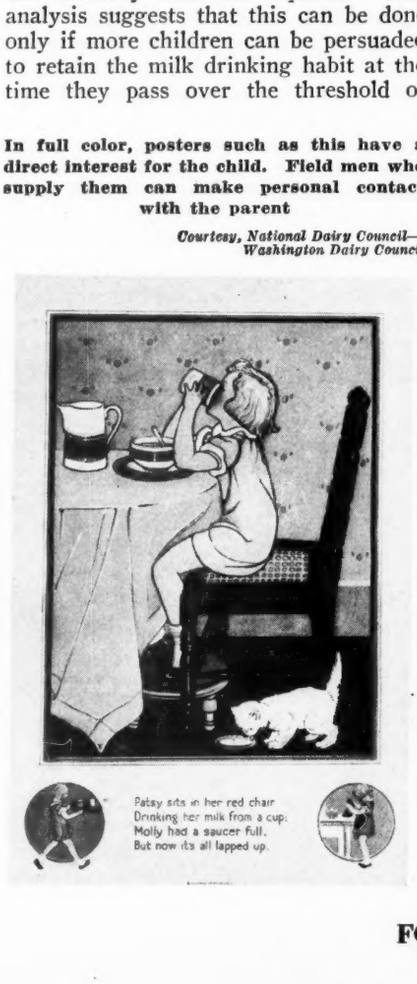
The objective is to make a confirmed milk drinker out of the child so that he will keep on liking and drinking milk all through life. Under this plan the drinking of milk becomes a regularly performed part of the school program in which all children participate. As children like to do the things which the group approves, the chances are that they all, even the children with food problems, will soon like to drink milk. This is particularly true if the milk is regularly placed before the child without any effort or cost on his part. The successful completion of this program should diminish the proportion of maturing children who permanently cease to drink milk when passing through the teens.

While the desire to increase milk consumption in the future is in itself a sufficient incentive, there is yet another which prompts—even necessitates—the initiation of an aggressive program for stimulating per capita consumption. The annual loss of milk sales which accompanies the passing of the child into adulthood is unnoticeable only because a new group of children of the runabout age regularly replace that just graduating into the class of adults. But the steadily advancing average age of the population, due to lower birth rates as well as to lower death rates, is gradually reducing the importance of this sustaining influence.

There appears in the not far distant future a genuine threat to the maintenance of even the present rates of milk consumption. To stave this off the best efforts and the full resources of the industry will be required. Our analysis suggests that this can be done only if more children can be persuaded to retain the milk drinking habit at the time they pass over the threshold of adulthood. In other words, the future trend of per capita milk consumption depends mostly upon the prevalence of the milk drinking habit.

In full color, posters such as this have a direct interest for the child. Field men who supply them can make personal contact with the parent

Courtesy, National Dairy Council—Washington Dairy Council



But this is such a far-reaching conclusion that perhaps a very brief appraisal of the possibilities of the alternative sources of growth is necessary before such a peremptory dismissal is warranted: (1) Besides for drinking, milk is also used in the home for cooking. Unfortunately, there is no evidence now at hand which indicates the probability of any substantial per capita increase for this purpose. In fact it seems entirely possible that evaporated milk may even displace some of the fresh milk now used. Thus we must rule this out as an important source of future gain. (2) Attention was called to the large potential market which exists among families with the very lowest incomes. If some way could be found to give substance to these unfilled demands large increases in consumption would be realized. But the limiting factor is income. The possibility is not at all promising that the income of this group in the future will be larger than, or even as large as, during the past decade. (3) Some gains may be had by concentrating efforts upon specific families in the community who for no very adequate reason do not use as much milk as those in similar circumstances.

While aggressive sales efforts along any one of these alternative lines of approach may bring a favorable response, still our feeling is that these will not suffice. We thus return to the conclusion that the continued expansion of per capita milk consumption finally depends upon the future course of the milk drinking habit. The perpetuating and further stimulation of this habit constitutes the major sales problem now before the dairy industry.

Among all other food products milk today occupies a unique position. Every social agency and medical authority recognizes its value and urges an increased per capita consumption. In fact, in volume and effectiveness these agencies are conducting a sales program which far surpasses that of the dairy industries. Agencies such as the school, the visiting nurse, the community center, the department of public health, in working for an increased consumption, have as their purpose the desire to improve health.

If milk distributors are concerned in increasing per capita consumption, why not emulate the methods used by the most important social institutions? We would suggest that a proper, economic, and efficient way of doing this would involve a pooling of advertising funds by the dealers in each market and the pursuance of an increase in sales on strictly non-partisan lines — through education of families by personal contact in the groups where a larger potential demand exists.

Corn-Hog-Pork-Lard Relationship Affects Many Industries

By R. S. McBRIDE
Assistant Editor, Food Industries

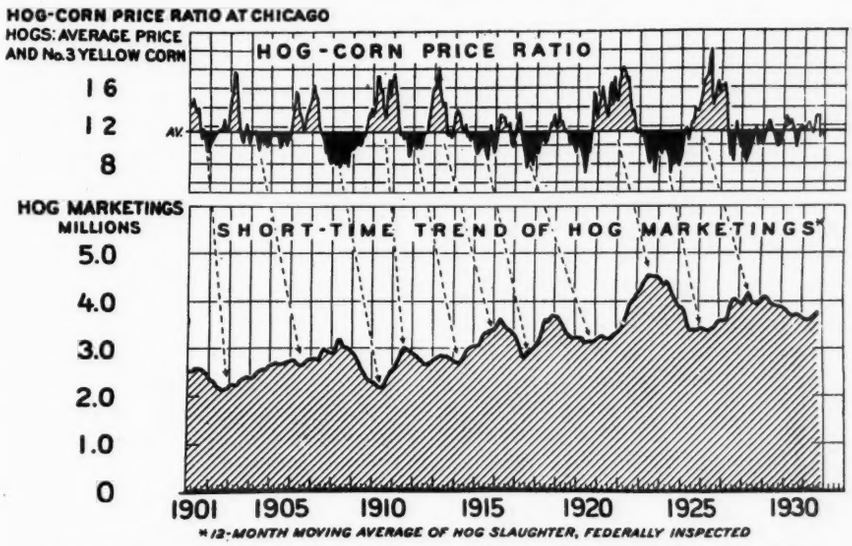


Fig. 1—Hog-corn price ratios and hog marketings. The normal ratio between prices for hogs and No. 3 yellow corn, in Chicago, is 11.42

SUCKLING pigs in Iowa are potential British breakfast bacon. This relationship, geographically remote, is in an economic sense so direct as to be almost obvious. It is not so clear, nor so widely recognized, how this same little pig affects the price of butter in Copenhagen, the prospective planting of cotton in Texas, the price of peanuts in the Carolinas, and whether Scandinavia will send out its customary fleet of whaling ships. Yet the relationship is such that actually these distant activities are intimately associated with the size of litters in our hog-growing areas. There is, perhaps, no more striking case of the interlocking nature of our food industries than in this group of pork-growing and pork-products-marketing activities. The ratio between the price of corn and the price of hogs in any particular area naturally determines for an individual farmer his desire to feed or to sell his corn crop. This simplest of relationships is graphically demonstrated in the accompanying chart, Fig. 1 which shows the close relationship between the price ratio and the number of hogs which reach the market. The reason for this relationship is easily discovered. If the price of hogs is low relative to the price of corn, the farmer is certain to be influenced toward a restriction of hog growing and fattening. By about eighteen months after a low point in the ratio is reached, the effect is sufficient to reduce the marketing of hogs below normal. Then, of course, the compensating tendency to a higher ratio and a new cycle begins.

During 1931, however, there was quite a different influence superimposed on this relationship. Not only was corn cheap, but wheat also. The best way that the wheat grower could realize on his surplus production appeared to be to use it for livestock feeding, most expeditiously of all through hog feeding. The low capital requirement to start hog raising also aided him. Furthermore, in much of the United States where the surplus of grains could be obtained at nominal cost there was a deficiency of other cash income, notably in the South. The Southern farmer, therefore, had also the inducement of making himself more independent of purchased food.

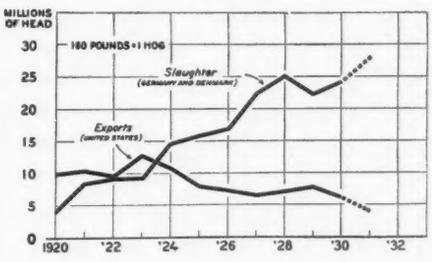
At this point one sees that cheap cotton had an important and immediate influence in increasing the hog population. And the census of hogs taken Jan. 1, 1932, definitely reflects the consequence: a 22 per cent increase in pig population in the South Central states. A 19 per cent increase occurred in the eastern corn belt, but only a 6 per cent increase in the western corn belt, where drought conditions had restricted surpluses of corn and other grains. In the aggregate, there was a 9.4 per cent increase in the number of hogs on farms as contrasted with Jan. 1 a year ago.

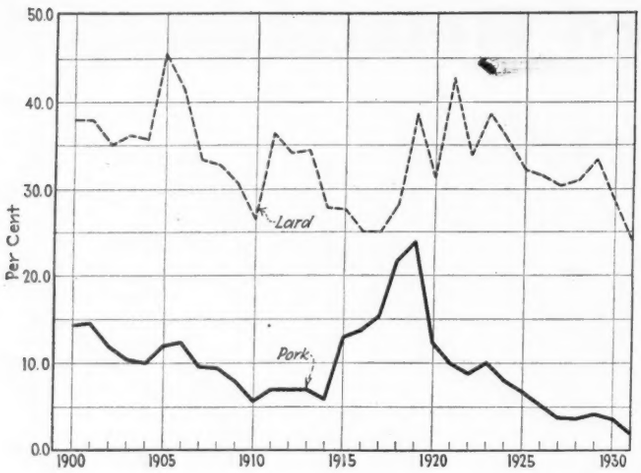
Food-industry consequences of this can be in some measure accurately forecast. The offerings for slaughter may be expected to increase correspondingly in most of the country. Where the marketing is done locally or the slaughtering is at home on the farm, as may well be the case in much of the Southern area, the effect will be indirect, but none the less real on the pork packer. He may not only have more pigs to slaughter, but he will also have a smaller market in which to sell the products, a consequence quite as unpleasant.

Secondary, but serious, consequences in other food manufacturing as well as other agricultural activities may be expected. If lard is to be cheaper, or at least not to rise as might be expected during the normal movement over the customary three-year cycle, other fats will presumably also remain on low levels for competitive reasons. The overabundance of cottonseed available from recent surplus crops of cotton insure that this competing raw material is going to furnish an abundance of cottonseed oil as a prospective competitor of lard. If lard, and as a consequence cottonseed oil, is to be cheaper, may there not be some tendency even from this indirect influence to restrict the plantings of cotton during the coming year? Such restriction would be helpful to the cotton market if of any great size. But there is no danger that this restriction, even from a combination of all influences, will give us any shortage of cottonseed for oil crushing.

Here is where the whaling ship enters our picture. In recent years there has been a decided revival of the whaling industry. Some specialists in the oil and fat field insist that an important, if not actually determining, factor has been the increased usage of whale oil in the making of edible fats. Modern refining methods have produced oils from this greatest of marine mammals well suited for use as up to 50 per cent of the raw material of largely used European lard substitutes. But this year, particularly because of large whale-oil stocks, the sailings of the whalers are not being planned on so

Fig. 2—Relation of hog slaughter in Germany and Denmark to U. S. exports of hog products





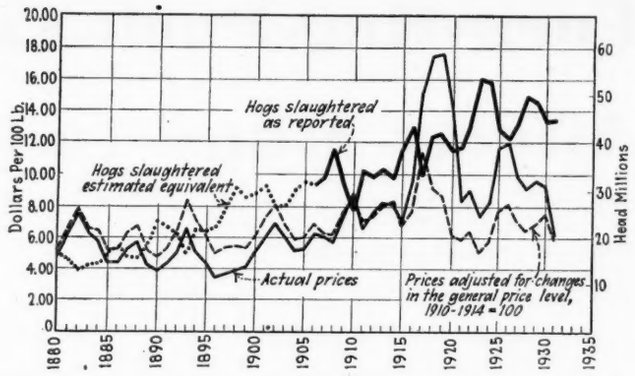

Dollars Per 100 Lb.
Head Millions
Hogs slaughtered as reported
Hogs slaughtered estimated equivalent
Actual prices
Prices adjusted for changes in the general price level, 1910-1914 = 100

Fig. 3—Left: Exports of pork and lard expressed as a percentage of total U. S. production

Fig. 4—Above: Relation between price and commercial slaughter of hogs

large a scale as during the last few seasons. Thus we find our Iowa pig is a factor in the extended mooring of whalers in Norway.

European dairy, pork, and lard problems are also becoming important factors. Briefly the relationship is something like this: Denmark, a dairying country of outstanding importance in Europe, has been developing a surplus of skim milk. This is the basis of its enlarged pork growing, the skim milk surplus of the Danes being fed like the corn surplus of the Iowa farmer. Paralleling the growth in strength of the dairy and pork industry in Denmark has been a definite German movement toward increasing self-sufficiency in pork and animal-fat supply. Fig. 2 shows how these two trends have combined to give a greatly increased production of pork for European consumption. Naturally, with nearer self-sufficiency, the imports of Europe have declined, occasioning a consequent decline in United States exports, shown on the lower curve of the same chart. As a result, instead of shipping abroad from 10 to 20 per cent of our pork and from 35 to 40 per cent of our lard production, the United States now finds export market for only 2 per cent of its pork and less than 25 per cent of its lard. From these facts it is not hard to see why the domestic pork products business has found increasing marketing difficulties. (The changes in percentage of pork and lard exported are shown graphically in Fig. 3.)

Users of edible fats of all sorts should study this hog and hog-products problem diligently. It has an important bearing on the price which they probably will have to pay in the coming months for lard and lard substitutes, or even for butter. It will suggest to them whether or not it is desirable to contract long in advance at present prices or to restrict their purchases in anticipation of declining prices.

No one can with any great certainty forecast these matters. There are too many factors involved. However, at the present time it clearly appears that all of the major considerations affecting the price and industrial supplies of edible fats favor maintenance of the present low price, or a somewhat

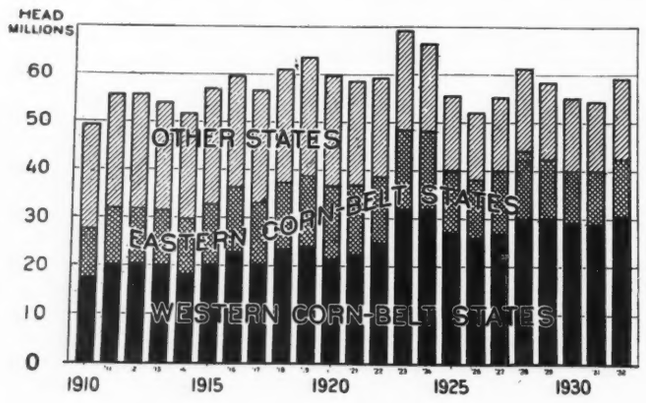
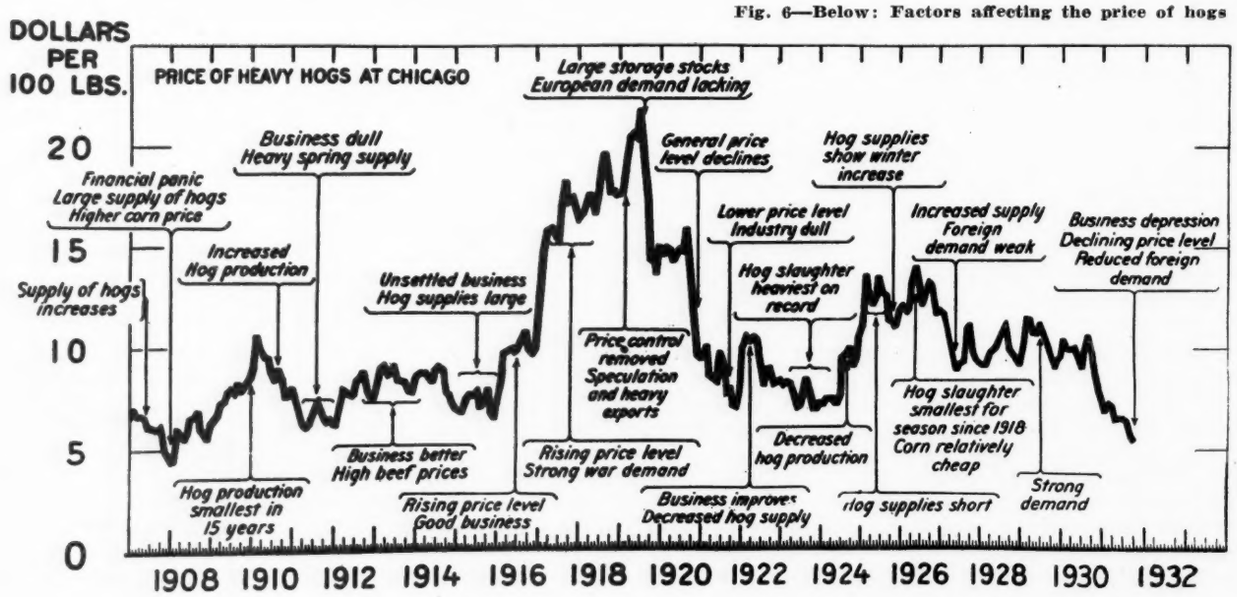


Fig. 5—Left: Number of hogs on United States farms

Fig. 6—Below: Factors affecting the price of hogs


DOLLARS PER 100 LBS.
PRICE OF HEAVY HOGS AT CHICAGO
Financial panic Large supply of hogs Higher corn price
Business dull Heavy spring supply
Supply of hogs increases
Increased Hog production
Unsettled business Hog supplies large
Large storage stocks European demand lacking
General price level declines
Hog supplies show winter increase
Lower price level Industry dull
Hog slaughter heaviest on record
Increased supply Foreign demand weak
Business depression Declining price level Reduced foreign demand
Price control removed Speculation and heavy exports
Hog slaughter smallest for season since 1918 Corn relatively cheap
Hog production smallest in 15 years
Business better High beef prices
Rising price level Good business
Rising price level Strong war demand
Business improves Decreased hog supply
Decreased hog production
Hog supplies short
Strong demand

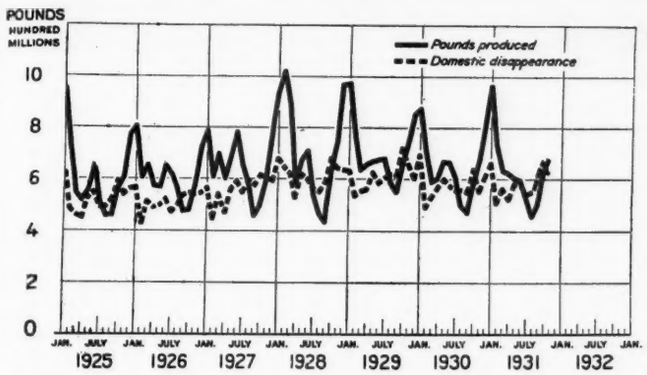


Fig. 7—Pork and lard from federally inspected slaughter and domestic disappearance showing great seasonal variation in production and comparatively uniform disappearance of these products into consumption

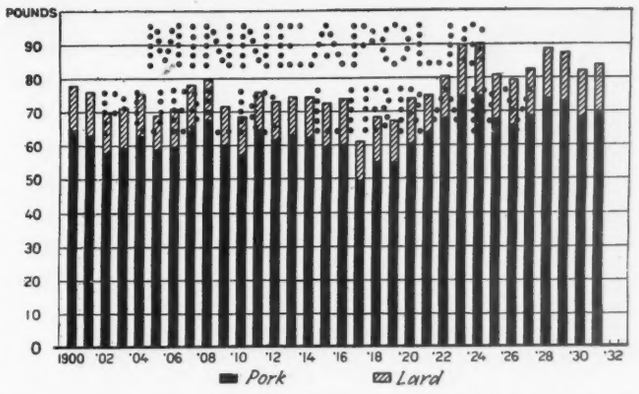


Fig. 8—Annual per capita consumption of pork and lard in the United States

further trend downward. This is bad news for the corn grower, for the hog raiser, even for the cottonseed crusher and the peanut-oil maker But it is a prospect which must be faced and it is a situation which will in no small measure determine fat buying during the coming months. In judging this situation, the following characteristics must be taken into account:

1. Unusually large hog population is found in Europe, and above average population in the United States.

2. With restricted buying power has come clear indication of restricted expenditure for meat of all classes.

3. An extremely active competition in the foreign markets for American cured pork and lard has resulted in smaller United States exports than in any time for 30 years past, with no prospect of a return to the old levels.

4. Low grain prices, both corn and wheat, give prospect of maintaining the pig population of the United States on present high levels, especially since it requires less farm capital for the feeding of swine than cattle.

5. With cheap corn and the consequent cheap hogs the cost for the raw material of the pork-products business should be a minimum. However, the competitive market situation will necessitate low retail prices for both meat and fat or the quantity of business will not suffice to absorb all of the hogs which will be offered at market. Under these circumstances, the packer's margin will be more likely to suffer from low market prices than to gain from low raw material cost.

6. Because of the necessity for absorbing all of the animals offered the quantity of pork packed probably will continue high regardless of market requirements. Hence the unit costs for manufacturing operations which depend primarily on total quantity of materials produced will remain at the present level or be lowered.

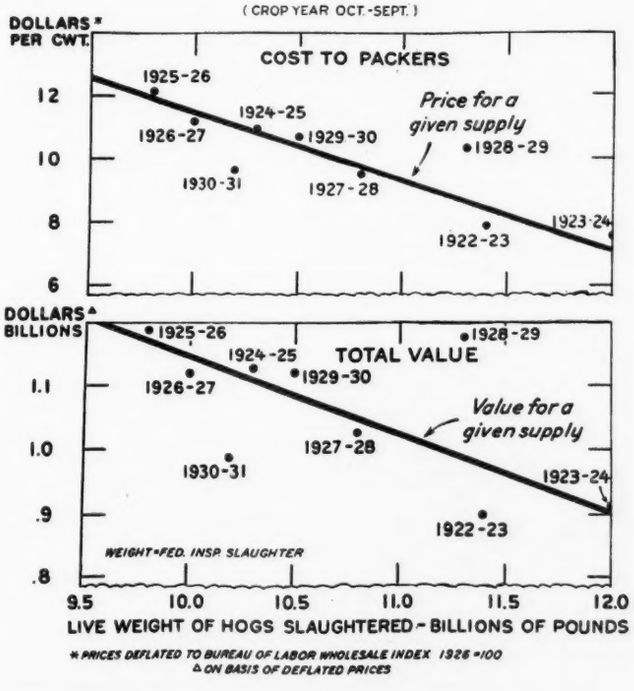
7. Prices of pork and lard are at the lowest levels of many years, but there is nothing either in supply or in the competitive market situation to indicate an early upward trend.

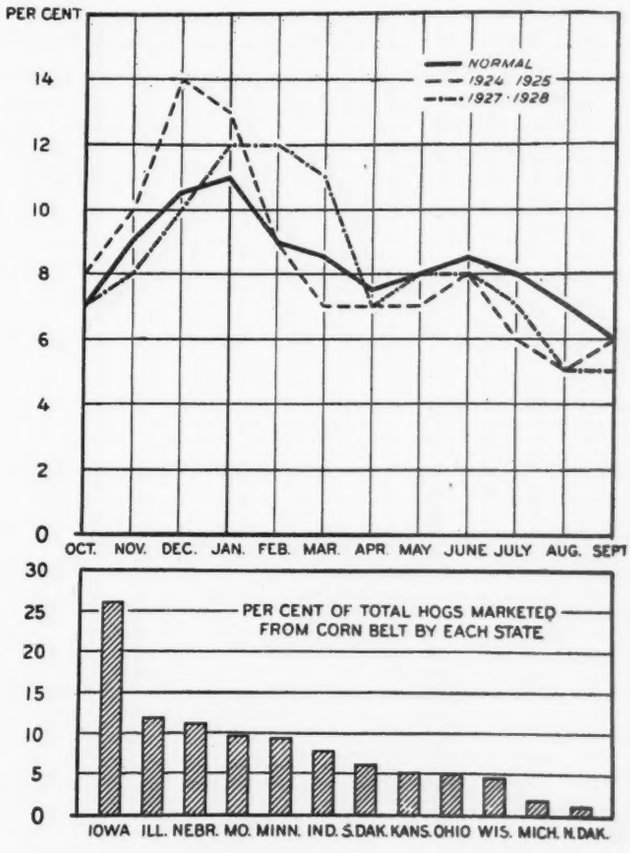
8. The ultimate conseqence can, therefore, hardly be anything except a continued low, or even lower, price for edible fats in the industrial United States markets.

FOOD INDUSTRIES *takes pleasure in acknowledging the cooperation afforded by Gerald B. Thorne, of the Bureau of Agricultural Economics, including the data and charts which have been prepared by him and his associates of that Bureau.*

Fig. 9—Below: Relation of hog supplies to prices and values

Fig. 10—Right: Corn-belt hog marketings in per cent of yearly total marketed each month and in per cent of total hogs marketed from corn belt by each state





How Eggs Are Dried

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By CARL G. BLOMBERG
Sioux City, Iowa

COMMERCIAL egg drying commenced some forty years ago, when German engineers built the first plants in China. In these plants all sorts of shallow pans were used: the eggs, after being cracked, and then separated or not, as the case might be, were poured into these pans to a depth of half an inch and exposed to the sun on the roofs of buildings. Later, special pans were designed for more convenient handling and the material was exposed to heat from stoves and other heating devices. Finally, elaborate plants were developed with controlled temperature and ventilation.

Egg drying falls into three classifications: whole egg, yolk, and albumen. The drying of whole egg and yolk are quite similar, but drying albumen is a different matter. Until recently the pan system was the only one that could be used successfully for all three products. The pan process used in the most modern Chinese plants for drying albumen is about as follows: The albumen, after being separated from the yolk, is poured through a fine sieve into wooden casks, each holding about 700 lb. It must then be fermented before it can be dried, and the casks serve as tanks in which to carry out the fermentation. Being an engineer and not a chemist, I am not informed as to the exact organism, or, in fact, whether the fermentation is caused by bacteria or enzymes; but the process begins, without the help of a starter, as soon as the casks are filled, and continues for 36 to 60 hours, depending on the temperature. Seventy degrees F. is considered the best temperature. *(Egg albumen dried without fermentation usually results in a dry product that will not whip to a stable froth when reconstituted. Such a product is of little value, even if it is soluble.* FOOD INDUSTRIES *will welcome comments from readers on the question of this fermentation—if it is fermentation—of egg albumen, and also on the whipping qualities of the product. What makes egg white whip to a stable froth?)*

As the fermentation continues, a scum rises to the top and is removed and discarded, and a sediment also settles to the bottom of the cask. While this is going on, samples are taken from the top by means of pipettes. When the sample shows that bubbling has practically ceased, and a sample that has been drawn off through a spigot located about three inches above the bottom of the casks also shows clear, the process is checked by the addition of about two ounces of aqua ammonia and about three ounces of alcohol per 100 lb., stirred in as the albumen is drawn off into wooden buckets.

The liquid egg white is then thinner and not as sticky as it was before fermentation. When dried, it is of a flaky nature and not tough as is albumen from fresh eggs broken directly into the drying pans. The fermented product also keeps better, as the natural fermentation has been checked. The tough unfermented product is quite insoluble, and brings a low price on the market.

After the fermented albumen is drawn off down to the spigot the sediment is washed out and thrown away. This waste amounts to 6-8 per cent. The casks are then washed, steamed, and dried. If this is not thoroughly done there will be an objectionable odor to the finished product in the next batch, the next fermentation will be too rapid, and it will be impossible to keep the product of a uniform quality.

The fermented liquid white is poured into round trays, resembling large pie plates, usually of zinc or aluminum, about 12 in. in diameter and 1¼ in. deep. The dry rooms are 25 to 35 ft. long by 12 to 14 ft. wide and 10 ft. high, with a 4-ft. aisle in the center and racks on each side spaced 10 in. apart. The capacity of the racks is 1,400 to 1,800 trays. Heat is then turned on, bringing the temperature to about 120 deg. F. and three or four 12-in. ventilators are opened for the first 18 hours, after which they are gradually closed. After 20 hours the temperature is slowly raised to about 140 deg. F. and kept there until the total drying time has been 40 to 45 hours and all ventilators have been closed several hours. The albumen is then thoroughly dry but very soft and must be carefully removed from the pans and placed on tables to cure for 24 hours more, when it is ready to be packed. The pans are

Egg Drying Plant of the China Desiccated Egg Co., Chengchow, China

thoroughly cleaned and oiled with neutral mineral oil and are then ready for the next run. The process of drying whole egg and yolk, in pans, is very similar except that fermentation is not necessary.

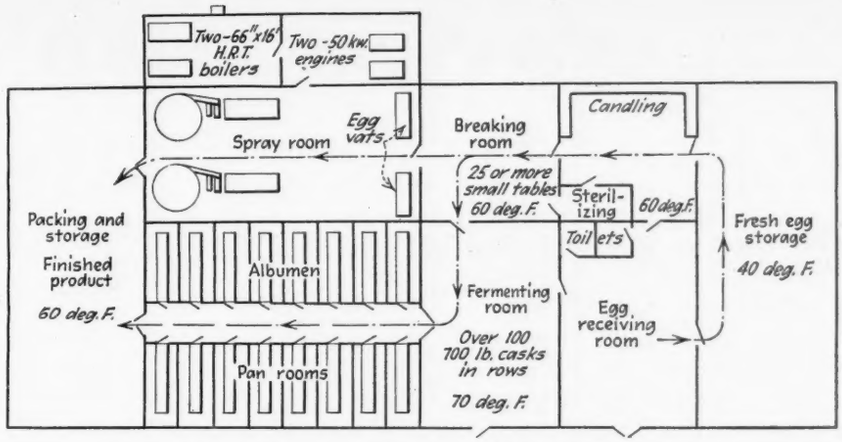
Today the pan system is very little used for whole egg and yolk on account of the cost and the low solubility of the product, but 90 per cent of the dried albumen on the market is still produced by this system, the oldest in general use, because it is the only system by which the Chinese plants have been able to dry albumen successfully.

In about 1903, the "belt system" of egg drying was devised and a few plants were built in this country, one being in New York State and one in St. Louis. In 1905 one of these plants was moved from St. Louis to Sioux City, Iowa, and installed in a new, well-built two-story brick building 80x150 ft., with ample provision for storage and refrigeration. Five belt machines were installed in this plant, the belts being endless, 4 ft. wide, of No. 11 gage sheet zinc. Later aluminum was substituted. These were carried on pulleys and idlers, the double belts being nearly the entire length of the building. The liquid egg was fed evenly on one end of the belt, which was kept moving slowly. Except at the two ends where the egg was applied and removed, the belt was inclosed in a heated and ventilated chamber with a temperature of about 160 deg. F.

The application was continued, layer after layer, until about 200 lb. of liquid yolk or 300 lb. of liquid whole egg had been applied, when the feeding was stopped and the belt continued in motion until tests showed the proper stage had been reached. Then the finished product was scraped from the belt and removed to the packing room. The machine, after cleaning, was then ready for another batch. I was connected with this plant for nearly the entire time it was in operation, and left it to go to China.

The belt machine is an American patent and makes a very flaky product, in appearance much like the finest grades of chipped soap. However, only about 20 per cent of the dried egg imported into this country is made on this type of machine. The first cost of a belt-machine plant is about three times as much as the cost of a plant of the same capacity equipped with spray machines. Albumen cannot be dried successfully on a belt machine because it will not adhere to the belt until dry. The product will not keep as well as that made by other processes and must be kept in cold storage at a temperature of 40 to 50 deg. F. but, at that, some users of dried egg prefer the flake egg made on the belt machine.

About the same time the belt machine came out, in 1903 or 1904, the "spray machine" was developed. Under this system the liquid egg is forced by



Layout of a Chinese egg drying plant of 5 tons daily capacity

powerful pumps through fine apertures under pressures of 1,500 to 3,000 lb. per sq.in. into heated chambers with a temperature of 160 to 220 deg. F. If the air is kept moving, and changed rapidly enough, it will take up the moisture from whole egg or yolk before it falls to the floor. After a period of operation it is customary to stop the plant, remove the product and thoroughly clean the machinery to prevent the egg becoming tainted. One of the worst difficulties with this type of machine has been that the first part of the batch remained in the machine long after it was dry and, unless care was used and the temperature kept low, it had a tendency to become partially cooked and therefore to have low solubility. Some of the late types of spray machines are self-cleaning, so that they can be run for weeks without shutting down.

The spray machine is the cheapest in first cost and the cheapest to operate. It works well on whole egg or yolk and can be made to dry albumen without going through the fermentation process. The largest size machines will produce 4,000 lb. of dry whole egg in 24 hours. Some are equipped with one to three sprays, but my experience is that the best results are obtained on machines with 24 to 30 spray nozzles.

Any process for drying albumen should leave the reconstituted product as nearly like fresh egg white as possible. The ideal to be striven for, is to turn out a product that is perfectly soluble and, when dissolved, can be satisfactorily whipped. My judgment is that this ideal will not be reached until albumen can be dried within a few minutes from the time the egg is broken and with the least possible exposure to contamination.

The lower the temperature of the air when it comes in contact with the egg, the better and more soluble is the product obtained. If the solubility falls below standard, the value is considerably reduced. Following are the standards of moisture and solubility with the quantity of dried product obtained from 100-lb. liquid for the three types:

	Whole Per Cent	Yolk Per Cent	Albumen Per Cent
Moisture	4–5	3½–4	16–18
Solubility	40–45	27–30	95–100
Weight from 100 lb. liquid	30 lb.	45 lb.	13 lb.

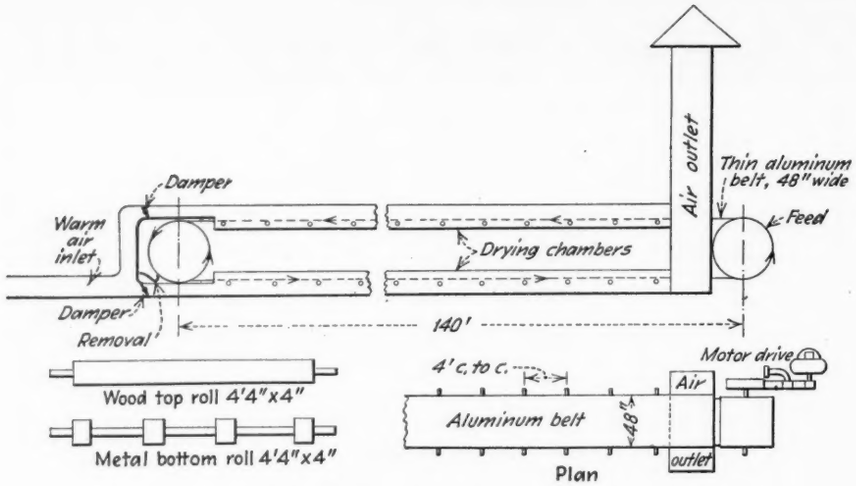
Dried whole egg, made on spray machines, that does not contain more than 4 per cent moisture, can be kept for a year in ordinary dry storage and still remain in good condition.

Up to this time, spray plants in China have not been successfully operated on albumen because they were designed for whole egg and the necessary adjustments to get satisfactory results on albumen have not been made. The latest developments in methods of drying albumen on spray machines have not been generally introduced into China. This largely accounts for the fact that 90 per cent of Chinese albumen is still dried in pans.

The question of sanitation in Chinese plants has been much discussed. In the large Chinese plants with which I was connected, conditions compared quite favorably with similar plants in this country; but when 50 to 150 operators are seated around tables in a large room cracking eggs into vessels which are dumped into other vessels and again into others until large vats are filled, and the material is left open, exposed to the air for hours, and then in open pans for days, there is every opportunity in the best plants for contamination. The largest plants are mostly operated by Europeans or Americans and they do their best to keep their product clean and free from disagreeable odors. The less said of some of the smaller native plants the better.

The better type of Chinese are very clean people—just as clean as the people of this country—but that cannot be said of all. However, the only sanitary method of drying albumen is by some process, like spraying, where the eggs are cracked only as they go into the machine, dried quickly with the least possible exposure to contamination, and immediately packed for storage. Such processes are the only ones that should be used.

Between 1903 and 1914 some half



Sketch of belt-type egg drying machine

dozen plants were built in the United States, drying whole egg principally, but as the World War came on, the cost of material and labor became so high that they could not be operated in competition with the Chinese, and all the American plants were moved to China. The Sioux City plant was moved to Nanking, China, in the year 1916. I went to China in the autumn of 1915 and built two plants at Hankow, one a belt machine plant with a capacity of 8,000 lb. of dried whole egg a day, the other a spray machine plant with a capacity of 4,000 lb. of whole egg a day. Later I built a plant at Chengchow, Honan, with a capacity of 16,000 lb. of yolk and 8,000 lb. of flake albumen in 24 hours. A picture of this plant is shown herewith.

These plants were all built entirely with native mechanics and laborers, but all machinery was made in the United States. The building mechanics were much above expectation but far below American standards. In installation of machinery and equipment the mechanics were very satisfactory except that it was not well to rely upon them too completely for accurate measurements or adjustments. Up to a few years ago the Chinese had not adopted the mechanical standards to which we are accustomed.

The eggs in China are somewhat smaller than in America—6 to 8 oz. less weight per dozen. American eggs run about 11 per cent loss for shell to the Chinese 15 per cent. In China, eggs were bought both by weight and by piece. They were brought to the plants in baskets holding from 700 to 900 eggs each. Some were carried on foot by coolies overland as much as 200 miles. A man would carry two baskets, which would be about the equivalent of four crates, as they are packed here with 30 dozen in each. In 1915, when I went to China, the price was about 2½c., U. S. money, per dozen, but when the World War reached its height the price advanced considerably and has remained relatively high to this time.

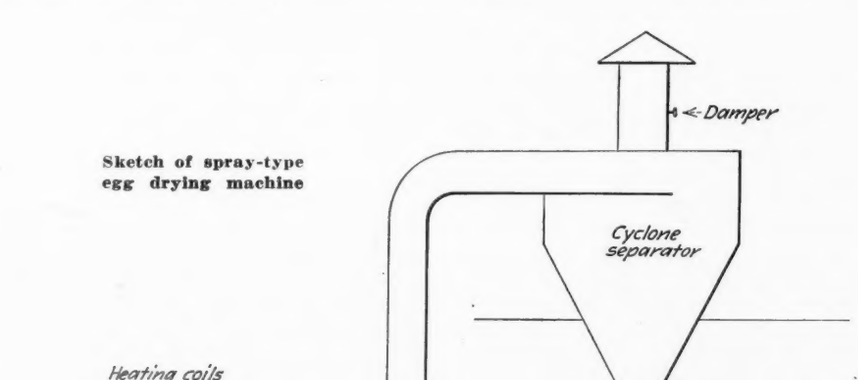
There are more albumen plants in China than yolk or whole egg plants, owing to the fact that, from Germany, France and England there had been a large demand for liquid yolk in barrels. This was prepared by simply beating the yolk thoroughly with about 2 per cent of boric acid. The yolk put up in this manner will keep several months without cold storage. It is understood that much of this material is used in Europe in the manufacture of margarine.

By the end of the World War, in 1918, some fifty or more plants had been built in China with capacities of from 500 to 24,000 lb. a day of finished product. The weight of finished dried whole egg obtained from a standard case of 30 dozen eggs is about 10 to 11 lb., which gives some idea of the magnitude of the industry.

While this development has been going on in China the industry in this country has been at a complete standstill. No real egg drying plant was built in the United States between the years 1914 and 1927, in which year I built a small plant in Kansas City. A number of attempts have been made to dry eggs on machinery primarily designed for the drying of milk, but the conditions are very different and while there has been partial success in drying whole egg and yolk, there has been little or no success in drying albumen with this kind of apparatus.

With the increase in tariff passed by the last session of Congress and a further increase by the Tariff Commission late last summer, a powerful stimulus has been given the industry in this country and every effort is being made by engineers to work out successful plants to dry albumen, as well as whole egg and yolk, by the spray process. Much progress is being made and considerable change may be expected in the types of new machines coming out. Small plants have been devised on principles quite different from those used in the older plants, which appear to meet the difficulties with entire success and, while no large commercial plants have yet been built on these principles, the indications are that the new plants to be built in the near future in this country will be radically different from the Chinese plants. One marked improvement already developed is the possibility of continuous operation, which was impossible in all of the old spray plants.

Sketch of spray-type egg drying machine



Overcapacity Ruins the Profits

The Plight of the Cottonseed Oil Industry Holds a Lesson for All Food Manufacturers

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Based in Part on a Report* of National Cottonseed Products Association, Inc.

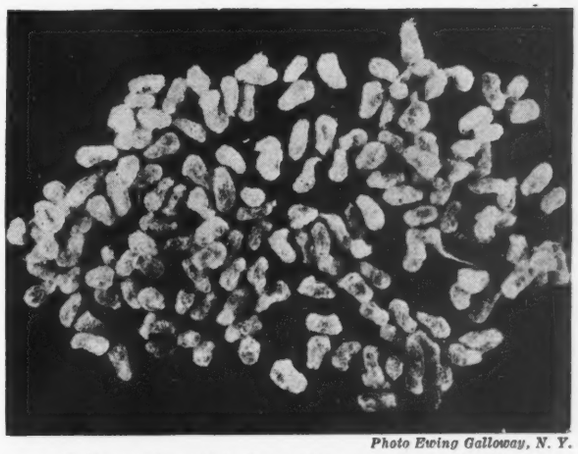


Photo Ewing Galloway, N. Y.

Cottonseed as it looks as it comes from the gin

"TOO much of a good thing is more than enough" is an old saying that has been disastrously demonstrated more than once in the last three years. Many industries have been overbuilt to such an extent that, even in the flush times of 1928 and early 1929, they could not operate at over 60 or 80 per cent of capacity. The automotive industry, for instance, is said to have sufficient capacity to turn out 10,000,000 units per year. Its best record of 5,621,709, for the United States and Canada, was but 56 per cent of this capacity. Other industries struggle with a similar, though not generally as large, overcapacity. The food manufacturing group is no exception, although figures that show what the condition is are mostly lacking.

However, a study completed in 1931 by the National Cottonseed Products Association indicates how overcapacity can grow and what serious effects such overcapacity can have. While the experience of this association, whose members are cottonseed crushers and producers of cottonseed oil, is somewhat unusual, because of the large quantity of inedible byproducts produced, still the experience of this group is near enough to that of other food manufacturers to give useful indications.

The reason for overcapacity in this industry lies in its growth from many small units located near the source of supply in earlier times when such a location was a necessity. Cottonseed crushing began to be important in this country in 1879, when it was discovered that cottonseed oil could be highly purified by the use of fuller's earth. With this pure oil available, food uses for the product mounted. While only 5 per cent of the cottonseed crop was crushed in 1875, in 1880 this had grown to 9 per cent, in 1890 to 25 per cent, in 1900 to 53 per cent, in 1910 to 73 per cent, 1920 to 79 per cent, and 1929 it was still 79 per cent. In these same years the cottonseed crop, in tons, was: 1880, about 3,000,000; 1890, 3,495,000; 1900, 4,668,000; 1910, 4,462,000; 1920, 5,074,000; 1929, 6,435,000.

These figures indicate that, while the cottonseed crop was doubling, the per cent of the crop that was crushed grew from 9 to 79, or from 270,000 to 5,083,650 tons. This growth has been in response to a demand for the products, so that it is safe to say that at present there is no overproduction.

From the beginning, however, cottonseed crushing has been a highly localized industry. At first this was necessary, for it was not economical, or even possible, to transport the seed long distances to centralized crushing mills. Also, at that time, cottonseed could not be held in good condition for long periods. Hence the industry is made up of many comparatively small units, widely scattered through the cotton-producing states, and apparently based on the idea that all the seed must be crushed in 100 days, or one-third of the working year.

The study already referred to covered about 1,700 presses in some 280 miles in the nine states of North Carolina, South Carolina, Georgia, Alabama, Louisiana, Mississippi, Tennessee, Arkansas, and Texas. These presses handled, in 1929, some 3,292,000 tons out of a total of about 5,084,000 tons crushed, or 64 per cent of the raw material of the industry. This is a sufficiently large part to indicate that the results of the study hold.

In terms of crushing capacity, based on an average daily figure of 15 tons per press, the study indicates that the 2,731 presses in the ten principal crushing states, if operated for 300 days annually, could crush 12,289,500 tons of seed. The average annual crush in the three years 1927 to 1929 was only 4,700,253 tons. The presses existing can therefore handle the work in 115 days, or 38 per cent of 300 days. This indicates, on a press-capacity basis, an overcapacity of 62 per cent.

In connection with this study it is well to keep these facts in mind: The industry is no longer handicapped by the necessity of crushing all the seed as soon as possible after delivery. Some of the largest concerns are now crushing throughout the year. All mills, while operating, work on a continuous schedule of 24 hours per day, six days per week.

Table I gives the combined figures for the nine most important states for the three crushing seasons of 1927-28, 1928-29, and 1929-30. The indicated net profit of $0.44 per ton over a period of three years' operation, compared to a cost of products of $50.46 per ton, is less than 0.9 per cent profit. This is so low a margin as to indicate that many of the mills in the industry are operating at a loss. In fact, the figures gathered in the survey show that during the period covered in Table I, 43.6 per cent of the mills operated at an average loss of $2.15 per ton, while 56.4 per cent reported an average profit of $1.85 per ton.

This is a clear indication of overcapacity, because, there being no serious overproduction in the industry, the lack of success of some of the mills can definitely be attributed to that fact that there are more presses available than

*"Facts About a Great Exclusively Southern Industry—Cottonseed," published by National Cottonseed Products Association, Inc., Memphis, Tenn., 1931.

Table I—Three Year Averages—1927-28, 1928-29, 1929-30

State	North Carolina	South Carolina	Georgia	Alabama	Louisiana	Mississippi	Tennessee	Arkansas	Texas	9 States Combined
Number mills reporting	90	72	84	56	40	99	36	58	296	831
Number presses represented	401	338	480	317	253	658	300	444	1,653	4,844
Average presses per mill	4.5	4.7	5.7	5.7	6.3	6.6	8.3	7.7	5.6	5.8
Tonnage represented	686,891	514,707	765,777	693,335	437,013	1,513,872	657,015	898,442	3,052,540	9,219,592
Average tonnage per press	1,713	1,523	1,595	2,187	1,727	2,301	2,190	2,024	1,847	1,903
Cost of seed	AVERAGE PER TON OPERATING COSTS AND RESULTS									
Transportation costs (1)	$1.47	$1.18	$2.20	$1.80	$2.26	$1.58	$2.24	$2.05	$1.93	$1.86
Total cost of seed delivered at mill	42.33	40.37	40.71	41.36	40.12	42.20	40.63	41.49	40.00	40.91
Current operating expense										
Wages, including night supt. (2)	2.12	1.93	1.82	2.21	2.14	2.04	2.04	2.04	2.03	2.04
Press cloth and yarn	.21	.23	.23	.24	.32	.25	.24	.27	.29	.26
Power, light and heat	1.32	1.35	1.43	1.02	.87	.93	.95	1.17	.91	1.04
Repairs	.93	.92	.90	.90	.97	.90	.88	.79	.67	.82
Mill expense (3)	.27	.38	.38	.39	.37	.36	.35	.35	.30	.34
Total current expense	4.85	4.81	4.76	4.76	4.67	4.48	4.46	4.62	4.20	4.50
Fixed and general expense										
Salaries, including day supt. (4)	1.35	1.36	1.29	1.00	1.05	.97	1.02	.91	1.05	1.08
Depreciation	.99	1.08	.92	.64	.85	.64	.75	.63	.92	.82
Licenses and taxes (excepting Federal Tax)	.35	.37	.25	.15	.42	.29	.19	.20	.26	.27
Insurance	.38	.35	.36	.29	.46	.45	.40	.47	.60	.47
Interest on capital (5)	.48	.44	.45	.46	.45	.81	.40	.64	.48	.54
Office expense	.25	.25	.33	.24	.20	.20	.20	.21	.19	.22
Brokerage on products sold (6)	.24	.06	.07	.07	.14	.16	.11	.11	.13	.12
Traveling and auto expense	.13	.16	.21	.13	.12	.12	.06	.16	.11	.13
Administrative expense (6)	.51	.20	.58	.28	.16	.34	.51	.41	.23	.33
All other expenses	.38	.45	.45	.29	.13	.31	.20	.23	.24	.28
Total fixed and general expense	5.06	4.72	4.91	3.55	3.98	4.29	3.84	3.97	4.21	4.26
Total conversion cost	9.91	9.53	9.67	8.31	8.65	8.77	8.30	8.59	8.41	8.76
Package expense (7)	1.17	1.10	.94	1.04	.54	.48	.61	.86	.77	.79
Total cost of products	53.41	51.00	51.32	50.71	49.31	51.45	49.54	50.94	49.18	50.46
Total sales of products	52.75	51.28	50.02	51.20	50.39	52.61	50.97	51.39	50.13	51.06
Gross profit or loss	.66*	.28	1.30*	.49	1.08	1.16	1.43	.45	.95	.60
Federal income tax	.12	.16	.06	.13	.16	.19	.19	.10	.20	.16
Net profit or loss	.78*	.12	1.36*	.36	.92	.97	1.24	.35	.75	.44

*Denotes loss

are needed. This, of course, results in some of the presses operating for such a short period each year that the overhead and fixed charges which these presses incur makes profitable operation out of the question.

Figures gathered by the association bear out this conclusion. A summary of these figures for the three years of the study is given in Table II. The study divided the mills into six groups, in accordance with the annual tonnage crushed. Reference to Table II shows a full correlation between low volume and high costs and between high volume and low costs. Mills in the lowest volume group, with an average crush per press of but 740 tons per year, operated on a conversion cost of $13.56 per ton, whereas those in the high volume group, averaging 3,468 tons per press per year, had a conversion cost of but $8.08 per ton. This variation of $5.48 is ample reason why the first group lost $2.89 per ton, while the last group made a profit of $1.88 per ton.

Referring again to Table II, it will be noted that the larger mills (those averaging more presses per mill) tend to fall in the high volume-low cost group.

The generalization to be deduced from these figures is that there are too many mills and also too many *small* mills. It is also apparent that the mills which made the best profit showing also paid the best return to the producers and handlers of seed, the difference being $2.50 per ton as compared to what the highest cost group paid. The fact that the mills which operate at the best profit also provide the seed producers with their best market is significant.

Of course, these generalizations agree so closely with what is to be found in all other industries that they could have been made without the study. Where overcapacity is found in an industry, it is usually associated with many small manufacturing units, much obsolete equipment, and low returns to producers.

The indicated remedy—concentration of the production in the low cost units, accompanied by shutting down those

Table II—Comparison of Operating Results of Reporting Mills Grouped According to Annual Volume of Crush Per Press

Group 1—1,000 tons per press or less.
Group 2—1,000 to 1,500 tons per press.
Group 3—1,500 to 2,000 tons per press.
Group 4—2,000 to 2,500 tons per press.
Group 5—2,500 to 3,000 tons per press.
Group 6—3,000 tons per press and over.

Group	No. of Mills	No. of Presses	Average Presses per Mill	Average Tonnage per Press	Seed Cost Del'd Incl. Transp.	Total Conversion Cost Incl. Pkg. Expense	Total Cost Products	Total Value Products	Net Profit or Loss After Deducting Federal Tax
SEASON 1927-28									
1	44	225	5.1	714	$42.40	$13.75	$56.15	$54.05	$2.15*
2	65	336	5.2	1,286	42.91	11.04	53.95	53.94	.14*
3	67	411	6.1	1,744	43.68	9.73	53.41	53.91	.39
4	51	311	6.1	2,251	44.05	9.73	53.78	54.81	.89
5	18	133	7.4	2,795	46.32	9.17	55.49	57.15	1.44
6	19	122	6.4	3,401	44.06	8.13	52.19	55.39	2.81
SEASON 1928-29									
1	33	179	5.4	721	41.47	13.74	55.21	51.81	3.46*
2	63	303	4.8	1,271	41.38	11.01	52.39	51.36	1.13*
3	75	446	5.9	1,718	42.94	9.81	52.75	53.11	.19
4	63	392	6.2	2,262	43.61	9.29	52.90	53.06	.02
5	24	143	6.0	2,722	43.57	8.64	52.21	52.39	.04
6	20	160	8.0	3,404	45.56	7.95	53.51	54.95	1.25
SEASON 1929-30									
1	57	312	5.5	764	35.34	13.31	48.65	45.62	3.06*
2	49	258	5.3	1,280	35.88	10.20	46.08	45.97	.22*
3	62	358	5.8	1,783	35.77	9.59	45.36	45.60	.13
4	59	379	6.5	2,234	35.89	9.22	45.11	46.01	.76
5	27	195	7.2	2,768	36.59	8.33	44.92	46.38	1.24
6	26	191	7.3	3,564	36.05	8.16	44.21	46.29	1.83
THREE-YEAR TOTALS AND AVERAGES									
1	134	716	5.3	740	38.99	13.56	52.55	49.71	2.89*
2	177	897	5.1	1,280	40.38	10.78	51.16	50.78	.49*
3	204	1,215	6.0	1,746	41.03	9.72	50.75	51.12	.24
4	173	1,082	6.2	2,249	41.06	9.39	50.45	51.12	.52
5	69	471	6.8	2,762	41.46	8.66	50.12	51.25	.94
6	65	473	7.3	3,468	41.24	8.08	49.32	51.47	1.88

*Denotes loss.

units that are less suited to do the work under modern conditions—is easy to prescribe but hard to take. It may seem to many to be an impossible task, short of industry combinations that would violate the anti-trust laws. However, it does seem that the cottonseed crushing industry has made a definite step toward correcting its troubles by making this study, which brings the true conditions before every one who is in a position to act. Perhaps this action will encourage some of those who are now losing on their mills, and have been losing for some time, to give up the battle, to the benefit of all those who remain in the field.

What this overcapacity really means to the industry is indicated by Table III. This shows that if the total tonnage of cottonseed crushed in 1927-28 had been converted on the basis of the low average cost of the Group 6 mills, as compared to the higher average costs shown by the other five groups, a saving of $8,012,734 might have been made. For the three years of the study, the saving would have been $21,700,872. What this would have meant to the industrial health and financial prosperity of the industry is obvious. That such a saving would also benefit agriculture is likewise obvious, for all that can be paid to the producer of the seed is the difference between what the consumers pay for the products and the costs required to obtain the services of all the factors between the farmer and the consumer. Every reduction in the cost of these operations will in part be passed on to the seed producers.

Whatever may be the action of the National Cottonseed Products Association resulting from this study, the course that the association has taken is one that might well be emulated by others. Wherever overcapacity exists in the food industries, something should be done to lessen its evil effects. By carrying out a study such as was made in the cottonseed crushing industry, one which bares the facts as to costs, the chances are increased that any action that is taken will be effective.

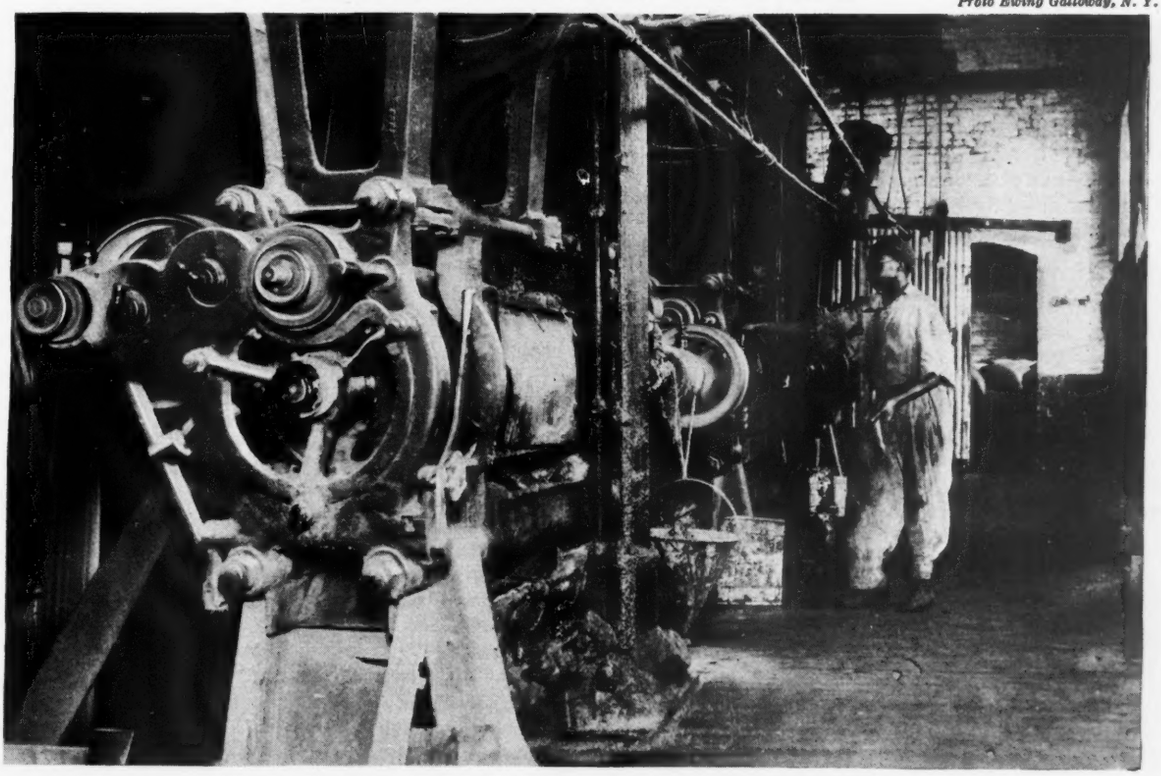
Table III—Showing Indicated Excess Conversion Cost for Groups* 1, 2, 3, 4 and 5 Compared With Lower Conversion Cost Shown for Group* 6 Mills, Based on the Several Group Proportions of the Total Crush as Reported by the U. S. Bureau of the Census

Group	Number Reporting Mills in Each Group	Group Proportion of Total Crush	Per Cent of Total	Average Tonnage per Press	Total Conversion Cost Incl. Pkg. Expense	Excess Conversion Cost per Ton	Total Excess Conversion Cost
			SEASON 1927-28				
1	44	267,606	5.75	714	$13.75	$5.62	$1,503,946
2	65	719,046	15.45	1286	11.04	2.91	2,092,424
3	67	1,193,290	25.64	1744	9.73	1.60	1,909,264
4	51	1,164,900	25.03	2251	9.73	1.60	1,863,840
5	18	618,519	13.29	2795	9.17	1.04	643,260
6	19	690,656	14.84	3401	8.13	.....	.....
Total.....		4,654,017	100.00				$8,012,734
			SEASON 1928-29				
1	33	214,083	4.23	721	13.74	5.79	$1,239,541
2	63	628,077	12.41	1271	11.01	3.06	1,921,916
3	75	1,249,575	24.69	1718	9.81	1.86	2,324,210
4	63	1,446,450	28.58	2262	9.29	1.34	1,938,243
5	24	634,657	12.54	2722	8.64	.69	437,913
6	20	888,216	17.55	3404	7.95	.....	.....
Total.....		5,061,058	100.00				$7,861,823
			SEASON 1929-30				
1	57	365,144	7.28	764	13.31	5.15	$1,880,492
2	49	506,086	10.09	1280	10.20	2.04	1,032,415
3	62	977,563	19.49	1783	9.59	1.43	1,397,915
4	59	1,297,064	25.86	2234	9.22	1.06	1,374,888
5	27	827,091	16.49	2768	8.33	.17	140,605
6	26	1,042,766	20.79	3564	8.16	.....	.....
Total.....		5,015,714	100.00				$5,826,315
Total Excess Conversion Cost for Three Years.....							$21,700,872

*For make up of groups see Table II.

View in a modern cottonseed oil mill, showing the expellers

Photo Ewing Galloway, N. Y.



Tomato Juice Must Be Standardized*

By R. H. WINTERS
Research Division, American Can Co.
Maywood, Ill.

LAST year at this time many people were just becoming acquainted with tomato juice. Today, almost everyone has tried it. To many it was a product with a new zest, palatable and highly pleasing as an appetizer and a beverage. Unfortunately, however, too high a percentage of individuals tried juice which did not make them permanent customers.

Time will, of course, erase from their minds this condemnation. The extreme popularity of tomato juice will cause them to try another brand. They will become continued users of this brand so long as they find it of uniformly high quality. Right now, the foremost need of this industry is for standardization of quality.

We are not particularly concerned with standardization of consistency for the consistency of each juice is controlled to suit the taste of the packer and his trade. Slight color variations are inevitable, and the consumer is not so discriminating as to contrast one juice with another for trivial color differences.

Irrespective of all manufacturing claims, color, consistency, or what not, tomato juice must have the true and pleasing tomato flavor. An initial sale can be made on the strength of vitamin potency, but no one will make tomato juice a part of the daily diet if it has an offensive or medicinal taste.

It is not my intention at this time to be an alarmist, but to present the true situation and to ask you to pause, examine your entire pack, and see if you can explain the flavor and quality differences existing throughout in your own warehouse. Judge for yourself if your entire pack is quality merchandise, as good as the best that can be regularly found on the grocer's shelf. If it is not of uniform quality, and does not merit the reputation of an established label, there are irregularities of procedure which should be corrected.

Equipment and mode of procedure can, of course, make or ruin a good juice, but good raw material is the first essential.

All other conditions being equal, tomato juice is a direct reflection of the quality of tomatoes used in its preparation. Under-ripe, over-mature, or blemished stock can be detected by the characteristic flavor imparted. Any tomato, or portion of a tomato, which you would be unwilling to eat should not be used for manufacturing juice. No one should continue to labor under the delusion that tomato juice is a by-product of the tomato canning industry. Tomato juice when packed is the product. Canned tomatoes, pulp, and catsup must be secondary. There is absolutely nothing that I or anyone else can tell you about equipment or method of preparation that will enable you to make a standardized quality pack out of inferior tomatoes.

Conservation of vitamins in tomato juice is an important consideration, as tomato juice has attained much publicity through the present interest in dietetics. Tomato juice may be an excellent source of vitamins A, B, and C. The quantities of these which a juice will contain, however, depend largely on the method of preparation. Vitamin A will fluctuate with the amount of the red fibrous material incorporated in the juice; a filtered juice has no measurable vitamin A content. Vitamin B is partially and vitamin C may be entirely destroyed by oxidation in the presence of heat.

The time is near at hand when claims for the presence of vitamins must be fortified by statements declaring the minimum units present for a given volume. Merely to state that the product contains these vitamins will not be sufficient, for such is unfair and actually misleading. We must have a standard declaration for vitamins. A juice is not a quality product when it has been robbed of these essentials. Unless the consumer can rely on this source of vitamins, his diet will be adjusted to obtain these essentials from other abundant sources.

The method of preparation must provide for rapid handling from the time of extraction to the point of sterilization. This point cannot be overemphasized. When the juice is expressed the tomato cells are broken and the juice is admixed with natural ferments and enzymes. These chemical substances, together with living microorganisms, act upon the juice and alter its composition. Rapid handling provides for an early destruction of these enzymes, ferments, and microorganisms before they have opportunity for sufficient action to influence the product perceptibly. Extracted pectinous and natural gum materials essential to non-separating qualities also are destroyed by enzymatic action. Here again we see how the speed of operation affects the resultant product.

Equipment design must include features which eliminate incorporation of and contact with air. Conservation of vitamins B and C depends on the equipment's efficiency in excluding air. Recently many statements have been heard concerning metallic contamination. As long as much of the present equipment is in use we will continue to hear more of the effect of metals on food products. Small quantities of copper and iron contamination in other food products will produce such familiar sights as "corn black," dark pork and beans, mottled kidney beans, etc. Such contamination may also be responsible for poor tomato juice color and bitter, astringent flavors. Non-corrosive materials must be used in equipment if dependable quality is to be assured.

Purchase and install equipment such as can and will be maintained absolutely clean. Canning equipment may be used for one or more products. In this case, it must be thoroughly cleansed of all residues from previous operations before it is acceptable for tomato juice manufacture.

*Summarized from an address at the meeting of the Tomato and Tomato Products Section of the National Canners' Association in convention at Chicago, Ill., Tuesday morning, Jan. 26, 1932.

ABSTRACTS OF CURRENT LITERATURE

THE EXTRACTION AND DETERMINATION OF VANILLIN IN CHOCOLATE AND COCOA BUTTER. D. M. Freeland. *Analyst,* Vol. 57, pp. 9-15; January, 1932.

Detailed procedure for the extraction and determination of purity of vanillin is described. The extraction process yields a recovery of 88 per cent of the 0.2 per cent of vanillin contained in cocoa butter. The method described for the extraction should serve equally well for fatty materials other than cocoa butter which contain dissolved vanillin.

* * *

IRRADIATED MILK: THE ENERGY REQUIREMENTS FOR ANTI-RACHITIC ACTIVATION. G. C. Supplee, M. J. Dorcas, and A. F. Hess. *Journal of Biological Chemistry,* Vol. 94, pp. 749-763; January, 1932.

Irradiation of milk on a commercial scale can be carried out under controlled conditions to yield a high degree of activation without the development of adverse secondary reactions which may occur after longer periods of exposure. Biological laboratory assays and clinical tests on infants show that the anti-rachitic and calcifying properties of milk can be regularly increased within a few seconds of irradiation.

* * *

DESIGN AND CONSTRUCTION OF SPECIAL VACUUM-DRYING APPARATUS FOR DEHYDRATION OF PRODUCTS WITH LOW VAPOR PRESSURE. G. F. Smith and O. W. Rees. *Industrial and Engineering Chemistry,* Vol. 23, pp. 1328-30; December, 1931.

The principles of construction of such equipment have been outlined. The dehydration equipment has a working temperature range of from 150 to 300 deg. C. at pressures of approximately 5 mm. of mercury. The use of a specially constructed condenser with mechanical-refrigeration unit, brine immersed, has been described. The use of the equipment as a refrigeration unit to be used in the commercial drying of gases using the reagent Anhydrone has been suggested.

* * *

ELIMINATION OF THERMOPHILIC BACTERIA FROM SUGAR. E. J. Cameron and W. D. Bigelow. *Industrial and Engineering Chemistry,* Vol. 23, pp. 1330-33; December, 1931.

Three major groups of thermophilic spore-bearing bacteria, in the main dissimilar but possessing in common the properties of high-temperature growth and ability to produce spores of high resistance to heat, are of major importance as causes of spoilage in non-acid canned vegetables. It has been established that refined sugar may be contaminated with one or more of these major groups, and, under such circumstances, be a direct or indirect cause of spoilage. Tentative bacterial standards for sugar for the year 1931 have been announced by the research laboratories of the National Canners' Association. At the present time, at least nine organizations engaged in the production of refined sugar have stated that they are prepared to furnish sugar which meets the standards.

* * *

RANCIDITY. H. O. Triebold. *Cereal Chemistry,* Vol. 8, pp. 518-532; November, 1931.

Three general types of fat deterioration may be termed oxidative, hydrolytic, and ketonic rancidity. Various tests for oxidative rancidity are discussed as well as various factors influencing this type of rancidity. The susceptibility of fats to auto-oxidation may be studied by one of several methods described. A promising possibility is the use of anti-oxygenic catalysts to prevent or retard the auto-oxidation of fats. A number of known inhibitors have a toxic effect in foods, but tests show that wheat germ oil as an ingredient in shortening for crackers actually exerted an inhibiting effect against the development of rancidity.

* * *

DIASTATIC ENZYMES IN MALT, FLOUR, AND OTHER FOODS. H. C. Gore and S. Józsa. *Industrial and Engineering Chemistry,* Vol. 24, pp. 95-102; January, 1932.

Sodium chloride or other salts when added to flour suspensions are found greatly to increase the solubility of the diastatic .liquefying .and saccharifying enzymes of flour. When no salt is added to flour suspensions, part of the saccharifying enzyme is released and then reabsorbed. When salt is present, the full diastatic power is released rapidly, and no absorption occurs. Papain is also found to greatly increase the solubility of both types of diastatic enzymes. The presence of neither salt nor papain appreciably changed the rate of saccharification in flour. Further results show that saccharifying power is less widely distributed in plant products than the liquefying power of diastase.

* * *

THE EFFECT OF HYDROGEN-ION CONCENTRATION ON THE TOXICITY OF SEVERAL PRESERVATIVES TO MICROORGANISMS. W. V. Cruess, P. H. Richert, and J. H. Irish. *Hilgardia,* Vol. 6, pp. 295-314; November, 1931 (California Agricultural Experiment Station).

The preventive effect on growth of organisms of several commonly used preservatives varies with the pH of the solutions in which they are used. Sodium benzoate was given the most thorough test by using a number of different organisms, including a species of *Saccharomyces ellipsoideus* from fermenting grape juice; a strain of *Mycoderma* from cucumber pickle brine and another from fermented apple juice; two species of *Penicillium,* a gray *Mucor* from fresh fruit, a culture of lactic bacteria, vinegar bacteria from cider vinegar; and cultures of *B. coli, B. sporogenes, B. subtilis,* and *Cl. botulinum.* In every case it was found that the concentration of sodium benzoate necessary to prevent growth, increased with the pH of the solution. The *Mycoderma* and *Penicillium* required less benzoate at pH 10 than at pH 7.3, which indicates a maximum tolerance to sodium benzoate between these two values. *Cl. botulinum* required 3.0 grams of benzoate per 100 cc. at pH 8.6 to prevent growth, while at pH 4 there was no growth even in the absence of benzoate. The spoilage of many preserved food products could be prevented with 0.1 per cent of sodium benzoate when the pH value did not exceed 4.0. Near neutrality, 2 per cent failed to prevent growth of molds, yeasts, and bacteria.

* * *

THE ANTI-NEURITIC VITAMIN. I—THE METHOD OF ASSAY AND OTHER STUDIES. R. J. Block, G. R. Cowgill, and B. H. Klotz. *Journal of Biological Chemistry,* Vol. 94, pp. 765-782; January, 1932.

The method of assay described is a combination weight-maintenance and curative technique carried out on pigeons. Studies on the concentration of the vitamin with silver under various conditions, and its solubility in certain organic solvents also are described. Silver nitrate, lactic acid, and barium hydroxide give the most favorable purification with the least loss in activity.

* * *

THE pH OF BUTTER AND ITS RELATION TO TITRATABLE ACIDITY. *Industrial and Engineering Chemistry,* Analytical Edition, Vol. 3, pp. 374-6; Oct. 15, 1931.

A method is outlined for the titratable acidity of butter, and another for the hydrogen ion concentration of butter. Various factors affecting these methods are discussed, and tabulated data show the relationship of pH to titratable acidity of a large number of samples tested.

* * *

DETECTING AND ESTIMATING METHYL CHLORIDE IN AIR AND FOODS. M. J. Martinek and W. C. Marti. *Industrial and Engineering Chemistry,* Analytical Edition, Vol. 3, pp. 408-10; Oct. 15, 1931.

Comparative studies of available field tests for methyl chloride in air showed the copper gauze-flame test to be the most efficient and rapid. A practical laboratory combustion method, sensitive to about 50 parts of methyl chloride per million parts of air, has been developed and described. This method is applicable to various types of samples, including air and food materials.

* * *

RELATION OF QUALITY IN DRY SKIM MILK TO BAKING STRENGTH. O Skovholt and C. H. Bailey. *Cereal Chemistry,* Vol. 8, pp. 374-80; September, 1931.

Heating skim milk for 30 min. at 77, 88, or 96 deg. C. before drying greatly improved the baking quality of the powder, and to about the same degree at each of these temperatures. Such preheating treatments did not affect the hydrogen ion concentrations of dry milks in flour-water suspensions. Dry skim milks depress the saccharogenic activity of flour-water suspensions, but this enzyme effect has not shown any significant agreement with temperature of preheating treatment. In spite of the inhibiting effect of dry skim milk upon this enzyme activity, the use of milk improved baking quality in each case.

BOOK REVIEWS

THE CHEMISTRY OF FLAVORING AND MANUFACTURE OF CHOCOLATE CONFECTIONERY AND COCOA. By H. R. Jensen. Published by P. Blakiston's Son & Co., Inc., 1012 Walnut St., Philadelphia, Pa., 1931. 406 pp., 6¾x9⅞; cloth; 23 illustrations. Price, $7.50.

THROUGH years of active work in the industry and as former chairman of the Consultative Panel, British Research Association for Cocoa and Chocolate, the author is preeminently qualified to write on the subjects covered in this reference volume.

Although less than half of the book is devoted directly to chocolate and cocoa, it has greater practical value to the chocolate manufacturer and technician than previous volumes published on these subjects alone. Just enough attention is given to the historical and agricultural aspects of the chocolate industry to make a satisfactory introduction for the exceptionally full and explicit information that follows; much of which has not been made accessible to food technologists previously.

Under proper headings the reader will find concise and easily understood descriptions, discussions, and processing data involving operation methods and equipment from the harvesting of the seeds to the storage of the finished products.

Completing this reference work on confectionery products, Jensen has made an excellent review of all raw materials entering into their manufacture and has given special attention to confectionery flavors. In fact so much specific information regarding materials used quite generally in food manufacture is included that this volume should be in general demand by all food technologists and executives.

In an unusual type of introduction marked attention is drawn to the chemist, his work, knowledge which he possesses but is not made use of by manufacturing executives, and the functional relationship that the chemical laboratory should have to a confectionery factory and to the management. E. S. STATELER.

* * *

POLICY AND ETHICS IN BUSINESS. By Carl F. Taeusch of Harvard Business Review. Published by McGraw-Hill Book Co., Inc., 330 West 42d St., New York, N. Y., 1931. 624 pp., 6¼x9¼; cloth. Price, $5.

"BUSINESS should render restrictive legislation unnecessary through so conducting itself as to inspire and deserve public confidence," quoting from "Principles of Business Conduct," as set forth by the Chamber of Commerce of the United States, might well be a sub-title to this addition to the businessman's library.

It is perhaps axiomatic to state that not only should business men study their markets quantitatively but also their position in those markets in relation to their direct and indirect competition, having in mind a type of competitive effort that is conducive to building the highest type of good will with all who come in contact with the particular business under discussion. A clear understanding of the underlying principles of all the main factors influencing a sound ethical business policy or policies, of course, is essential. Such an understanding can be approached through a study of Mr. Taeusch's book.

He sets up six main divisions of the subject: The Land, the People, and Their Ideas; Business and the Sherman Law; The Structure and Dynamics of Business; the Ethics of Price Policies; Unfair Trade Methods; and Self-Regulation in Business, and discusses them in terms of well-selected actual cases as reported to the Harvard Graduate School of Business Administration, plus Federal Trade Commission rulings and court decisions.

Chapters on the Sherman Law, Mergers, Trade Association Activities, Resale Price Maintenance, Price Discriminations, Price Cutting, Trade Piracy, Advertising, Cancellation of Contracts, and Limitation of Production deal with situations which American business men are facing today. A working knowledge of these present-day problems can be had by a study of the presented material, which, when applied, will materially assist in straightening out the present business tangle caused by the apparent discarding of many sound policies for others which, by their very nature, are temporary and confusing.

* * *

VERTICAL COOPERATIVE ADVERTISING. By Lawrence Campbell Lockley (in conjunction with the Association of National Advertisers, Inc.). Published by McGraw-Hill Book Co., Inc., 330 West 42d St., New York, N. Y., 1931. 267 pages, 5½x8¼; cloth. Price, $3.

AS we might expect of one of the Harvard business studies, published under the direction of the Graduate School of Business Administration, this book is a scholarly job. It is a bit unfortunate, though, that the title is so unchallenging and academic. The work itself is as vivid and specific an analysis as could be desired of a whole field of merchandising practice and malpractice. No one who manufactures goods for sale, be he an advertiser or non-advertiser, is untouched by vertical cooperative advertising—whether it be in the form of advertising allowances, "dealer helps," "free deals," or plain price concessions.

A fundamental point upon which this analysis of 235 replies to an extensive questionnaire rests is the distinction between "convenience" goods and "specialty" goods. Most food products are in the former class, and page after page of factual information make it obvious that vertical cooperative advertising for "convenience" goods is economically unsound. Other pages show, however, that under present competitive conditions it is often practically unavoidable.

Naturally, neither this book nor any other is going to eliminate unsound merchandising with a statistic or two. But at least there is no need for the manufacturer to remain in the dark as to the ultimate economic justification for the particular practices he has found necessary in his relations with dealers.

* * *

PRINCIPLES OF SELLING. By H. K. Nixon, School of Business, Columbia University. Published by McGraw-Hill Book Co., Inc., 330 West 42d St., New York, N. Y., 1931. 330 pp., 6x8¼; 28 illustrations; cloth. Price, $2.50.

ALTHOUGH written in textbook style and obviously intended for classroom use, this book will prove of interest and assistance to anyone confronted with the problems that attend the building and handling of a sales force. The author states that the book is the outgrowth of his search for the basic principles of selling over the past fifteen years which began with his reading of Harrington Emerson's "The Twelve Principles of Efficiency." He begins by defining selling as "the business of showing people how they can satisfy their needs, wants, or desires through the purchase of goods or services," and uses this definition as a guide for his subsequent treatment of the subject of selling.

Following a summarized history of the art of selling from the days of itinerant peddlers, the author sets forth ways of improving selling practice. To each of his nine principles of selling he devotes a chapter, and shows by contrasted cases the effectiveness gained by making use of the principle under discussion.

Although of greatest value of sales-managers interested in appraising ability and correcting weaknesses in sales force, the contents of this book are applicable to anyone who is interested in the manner and methods of selling. Each chapter ends with a list of questions and problems and a bibliography of suggested readings.

* * *

SPECIAL LIBRARIES DIRECTORY OF THE NEW YORK METROPOLITAN DISTRICT. Compiled and published by the New York Special Libraries Association, 2230 Municipal Building, New York, N. Y., 1931. 86 pp., 6¾x10; paper. Price, 50 cents to members; $1.50 to non-members of association.

IN THE 1931 edition of this directory are included only those libraries containing collections that are likely to be used by those seeking specific information. School, high school, and general college libraries included in previous editions are omitted.

The libraries are classified under groups with descriptive notes of each collection and are brought out in a supplementary subject index. It is interesting to note that six of these 325 metropolitan special libraries have collections dealing with food and food products.

The directory is alphabetically indexed in three indices to give the name of the organizations maintaining the libraries, the subjects dealt with in the libraries, and the personnel of the library staffs.

THE BUSINESS PAGE

Food Exports Drop to Pre-War Levels

EXPORTS of foodstuffs returned to pre-war levels in 1931, Department of Commerce statistics reveal. Their total value was $374,000,000, compared to $541,000,000 in 1930. Decreases in price, rather than decreases in quantity, were responsible for most of the loss.

The foreign market for fresh fruit continued to expand, and in spite of the low prices prevailing, held its own with a total of $56,249,000, less than half a million dollars below the 1930 figure. Why fruit should hold its own, while canned vegetables—particularly asparagus which has always been the leader—should drop so heavily, is a paradox that cannot be readily explained. Fresh fish products and vegetable oils, as well as feeds and fodders, showed gains in quantity, feeds and fodders making a particularly favorable showing with an increase of 75 per cent in quantity and 25 per cent in value.

Decreases were greatest in the meat trade, where the decline totaled 127,000,000 lb. valued at $30,000,000. The bulk of the drop occurred in the bacon trade. Canned meats remained fairly stable. Animal fats and oils declined about 30 per cent in value. Wheat and wheat flour, although not far below the 1930 figure in quantity, dropped in value to almost one-half the previous year's figure. Sugar, molasses, syrup, cocoa, chocolate, and spices all fell off in varying degrees. Evaporated milk remained fairly steady, and although condensed milk dropped considerably, exports of dried milk were nearly double the quantity shipped in 1930.

The United Kingdom and Germany, our largest export markets, both purchased more than a year ago. This gain was more than offset, however, by decreased purchases in Mexico and Cuba, which rank third and fourth in importance. Exports to South America, as well as to other European countries, decreased in varying amounts.

Hope Is Seen

The Business Week index for the week ending Feb. 13 shows business conditions to be 59.6 per cent of normal, in comparison with approximately 64.0 per cent for the two previous months. Weekly indexes of wholesale prices released by the Department of Labor report a decrease of 0.75 per cent in all commodities and 1.1 per cent in food prices for the first two weeks in February.

A weighted price index gives a 0.5 per cent decrease in general commodity prices and a 3.9 per cent increase in food prices for the week ending Feb. 20 in comparison with those of Jan. 23.

Further general wage cuts and increases in unemployment very probably are responsible for a decrease of 3.74 per cent in tonnage sales of A. & P. for the month of January as compared with January, 1931. (The first decrease in tonnage sales during this period of falling prices.)

Organized action that is actually returning idle men to work, labor union agreements which will tend to stimulate railroad and building-trade business, and likely early passage of a bank-credit expansion bill all give hope for an early change in these pessimistic business conditions.

Distribution of Sales, 1929, in the Bakery Products Industry, Other Than Biscuits and Crackers

(Released by the U. S. Bureau of the Census)

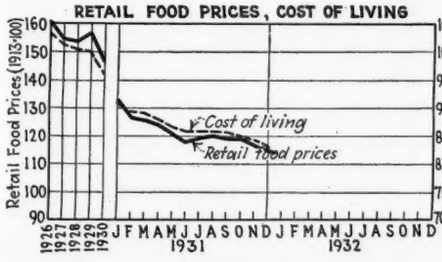
	Selling Value (f.o.b. factory)	Per Cent of Sales	Number of Plants—Total	Number of Plants—Selling Exclusively as Indicated
Total	$1,186,990,000*	100.0	16,016†	....
Sales to manufacturers' own wholesale branches‡	28,252,000	2.4	287	45
Sales to manufacturers' own retail branches	132,064,000	11.1	2,047	811
Sales to dealers				
Wholesalers (wholesale grocers and independent wagon distributors)	87,893,000	7.4	1,405	401
Retailers	603,329,000	50.8	6,418	2,180
Sales to consumers				
Large consumers who buy at wholesale (hotels, cafeterias, restaurants, etc.)	36,881,000	3.1	1,067	170
Home consumers	298,571,000	25.2	11,427	6,862

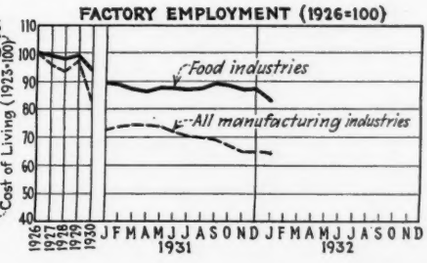
*This figure does not include $64,631,000 worth of sales which the manufacturing plants reporting were unable to distribute according to types of customers.

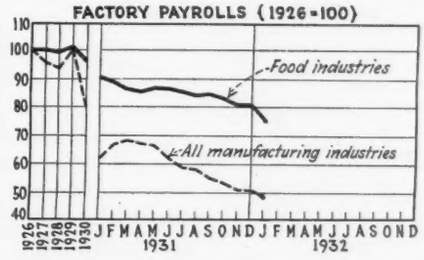
†The total number of manufacturing plants engaged primarily in the manufacture of bakery products, other than biscuits and crackers, is 20,410. Of these, 4,394 were unable to distribute their sales according to types of customers. Inasmuch as some of the other 16,016 plants sold to more than one type of customer, this figure is less than the total of the figures shown below it.

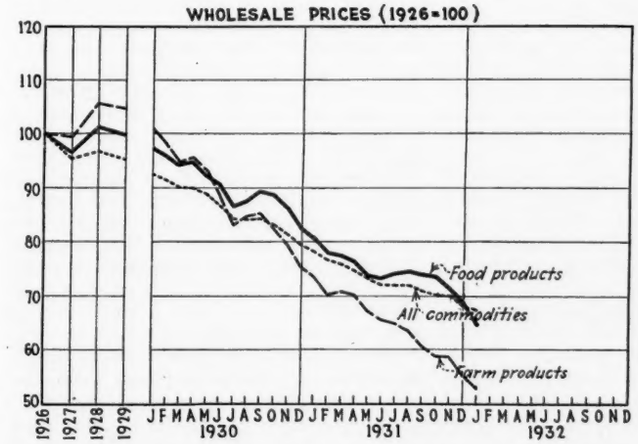
‡This report does not show the distribution of sales of manufacturers' own wholesale branches.

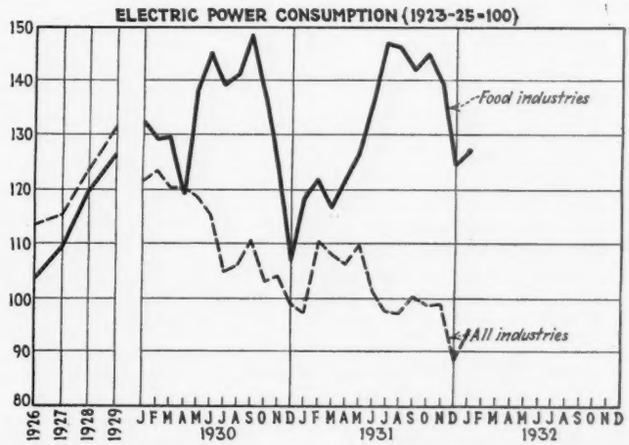
Retail food prices, factory employment, factory payrolls and wholesale prices are based on indexes of the Department of Labor. Cost-of-living index is that of the National Industrial Conference Board. Electric power consumption figures are furnished by *Electrical World*.


RETAIL FOOD PRICES, COST OF LIVING
Retail Food Prices (1913=100)
Cost of Living (1923=100)
Cost of living
Retail food prices
1926 1927 1928 1929 1930
J F M A M J J A S O N D J F M A M J J A S O N D
1931
1932


FACTORY EMPLOYMENT (1926=100)
Food industries
All manufacturing industries
1926 1927 1928 1929 1930
J F M A M J J A S O N D J F M A M J J A S O N D
1931
1932


FACTORY PAYROLLS (1926=100)
Food industries
All manufacturing industries
1926 1927 1928 1929 1930
J F M A M J J A S O N D J F M A M J J A S O N D
1931
1932


WHOLESALE PRICES (1926=100)
Food products
All commodities
Farm products
1926 1927 1928 1929
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1930
1931
1932


ELECTRIC POWER CONSUMPTION (1923-25=100)
Food industries
All industries
1926 1927 1928 1929
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D
1930
1931
1932

THIS MONTH

MARCH

1-16—Fourth Triennial Congress of the International Society of Sugar Cane Technologists, San Juan, Porto Rico.

2-4—Ninth Annual Course for Canning Field Men and Growers of Canning Crops, N. Y. State Experiment Station, Geneva, N. Y.

7-12—Second Packaging Exposition, Conference, and Clinic (American Management Association), Palmer House, Chicago, Ill.

14-17—American Society of Bakery Engineers, Edgewater Beach Hotel, Chicago, Ill.

16-19—Canners' League of California, Del Monte Hotel, Del Monte, Calif.

Hors d'Oeuvres

SELF-SUGARING DOUGHNUTS have been introduced in Cleveland, Ohio. Sugar at one end of a transparent bag is released when a ribbon is pulled. Those who like their doughnuts plain open the other end.

•

MAYONNAISE JARS have been successfully standardized as to volume. The U. S. Commerce Department has announced that a sufficient number of acceptances have been received to make the simplification program operative.

•

A FOOD DIVISION is to be formed by the British Society of Chemical Industry.

•

FREE SAMPLES for foreign countries are being urged as a sales promotion method for California fresh deciduous fruits and grapes. A thousand tons of fruit may be sent to foreign ports, along with plenty of advertising literature, for this purpose.

•

IN SHANGHAI, American bankers have forgotten the depression. Orders came from all sides—American forces took 10,000 loaves a day, Chinese troops, 20,000; orders from the Japanese couldn't be filled. Because all foods are scarce, prices of many products have skyrocketed. Meanwhile, sugar mills in Osaka, Japan, have shut down because of curtailed Chinese demand.

•

FROZEN CRANBERRIES have been successfully produced by the U. S. Department of Agriculture. Strangely enough, those packed in vacuum containers had a less desirable texture than those not vacuumized.

•

ALL BUTTER sold in Cleveland, Ohio, must be made from the milk of tuberculin tested cows, according to a new city ordinance.

What Food Men Are

Sugar Institute Fights—Cold-Pack

A Warehouse Employed—Elevator

Brain Food Again—

WHILE SUGAR PRODUCERS in Cuba and Java have been struggling to reach an agreement as to the size of the 1932 and 1933 crops, sugar refiners in the Southern District Federal Court have been struggling to prove to Judge Julian W. Mack that the Sugar Institute, Inc., has not violated anti-trust laws. In both cases, the results are still to be seen.

Chief points made by attorneys for the Department of Justice alleging restraint of trade by the Sugar Institute concern testimony that the organization fostered specific shipping routes, discouraging transportation economies that would have given some sugar handlers an opportunity to cut prices. Among prominent witnesses called by the government was Frank C. Lowry, now president of the National Biscuit Co., formerly head of Lowry & Co., sugar brokers.

Attorneys for the Institute deny any violations of the law. Apparently sensing the impossibility of steering a strictly legalistic course between conflicting anti-trust law decisions and provisions, they are taking a pragmatic stand, attempting to show that the institute has eliminated abuses without increasing the price spread.

COLD-PACK BARRELED BERRIES will be subject to a standard grading system in the near future. Cooperative efforts between the Northwest Fruit Barrelers' Association and the National Preservers' Association have already resulted in a tentative standard for strawberries approved by both groups. Little difficulty is anticipated in securing an official status for the grades through the U. S. Department of Agriculture.

In order that the tolerances established in the specifications may be judged under usual marketing conditions by preservers purchasing berries, a standard method of examination has been set up by the preservers' association, and members have been asked to sample at least ten barrels of cold-packed fruit and report defects outlined in the specifications. Standards for other cold-pack fruits are expected to result from the efforts now under way.

"OPEN SEASON Seen for Fad Food Laws"—thus a commercial newspaper refers to a number of bills concerning foods introduced in Congress. The National Wholesale Grocers' Association is opposing bills urged in the last report of the Food and Drugs Administration (FOOD INDUSTRIES, January, 1932, p. 38) which would increase penalties, tighten misbranding restrictions of compounds sold under distinctive names. Unfortunate divergence between state and federal laws would result, the association feels.

Two bills are aimed at margarine—one would prohibit its purchase for federal institutions, another would restrict packaging to original stamped containers. Poisons resembling food products in general appearance would have to be brightly colored, according to another bill. The Committee on Public Health Organization of the White House Conference on Child Health and Protection is urging amendments to restrict misleading advertising, prohibit additions of caffeine to beverages without declaration, and to widen the use of legal standards for foods.

UNEMPLOYMENT, as well as hunger, is being hit by establishment of a food warehouse operated by unemployed for unemployed in the New York area. Under direction of the City Food Relief Committee, in donated space in the Starrett Lehigh Building, unemployed carpenters, electricians, and plumbers have set up a modern food depot comparable in size to those created by relief bodies in the World War. It is being operated entirely by unemployed workers, chiefly those who have worked in the food industries.

The depot will handle food distribution for some 30,000 families found to be in immediate distress. Food is being contributed by local plants. Excess or slightly damaged stocks are being sought to provide an adequate supply without cash expenditure, and a trucking system to make regular collections has been set up. At the warehouse, the food is sorted, repacked and assembled in family units.

Headway against unemployment distress is also being made through the American Legion employment drive, backed by the American Federation of Labor and other national bodies, to secure pledges for the employment of 1,000,000 men for at least six months. Business men are being asked to hire one man, whether he be needed or not, in the belief that the slight individual expense will be offset by collective benefit.

ELEVATOR SERVICE for salmon has been provided at the 253-ft. Baker River Dam in Washington. Thus they can still satisfy the spawning urge and preserve an industry important to that section.

Things have not been made too easy for the salmon, however, for they still must climb 100 ft. on a "fish ladder" to reach the elevator. A height of 50 ft. had long been accepted as the limit to which salmon would climb the usual "fish ladder"—a series of steplike pools up which the salmon successively flop. Curved rods which prevent the tired fish from turning down-

Doing and Saying

Berry Standards—Fad Food Laws?—for Salmon—Shippers Are Upset—Sugar Isn't Syrup

—AND THE NEXT

APRIL

March 28-April 2—American Chemical Society, Hotel Roosevelt, New Orleans, La.

11-12—Bakery Sales Promotion Association, Wardman Park Hotel, Washington, D. C.
—American Dry Milk Institute, Chicago, Ill.

In its May issue, FOOD INDUSTRIES will present a symposium on various applications of heat to food manufacture and processing. It will cover the processes in which heat technology plays an essential part, the equipment used, and the problems that are met in this field.

stream have been installed, however, so that they now persevere for the 100-ft. climb. Next comes 700 ft. of flume ending in a final 2-ft. overpour at the foot of an inclined track. The fish then enter the elevator—a steel box on wheels—which is raised to the top of the dam when a proper load is aboard.

Year-old salmon going back to the sea negotiate the 253-ft. drop over the dam without aid, and apparently are none the worse for the experience.

A REDUCTION of 20 per cent in railway express rates on fresh fruits and vegetables in the South, proposed by the Railway Express Agency to meet motor truck competition, was suspended Feb. 3 by the Interstate Commerce Commission in response to the protest of the Southeastern Express Co., operating principally on the Southern Railway. Reductions in rates on fish also have been suspended pending investigation by the Commission. Even if the low rates are found justified by the Commission, the suspension of the tariffs, which were to have become effective Feb. 3, probably will not be lifted in time to permit application on the bulk of the next seasonal movement of fruits and vegetables.

Shippers that kept mum when the Interstate Commerce Commission was prying into reciprocity in the purchase of railway supplies and the routing of traffic now are beginning to protest vigorously against the recommendation of I. C. C. examiners that they should be deprived of their right to designate routing.

Fruit and vegetable shippers are even more upset. They point out that the marketing of perishable produce is made possible only by the flexibility of the rail service afforded. During the season cars roll toward important gateways daily for reconsignment when sold. To deny them the right to route their traffic, say the shippers, would disrupt the present system of distribution of fresh fruits and vegetables. Protests have been registered with the I. C. C. by the National League of Commission Merchants, International Apple Association, and Western Fruit Jobbers' Association of America. These organizations have retained counsel to fight the proposal on which the Commission will hear argument late in the spring.

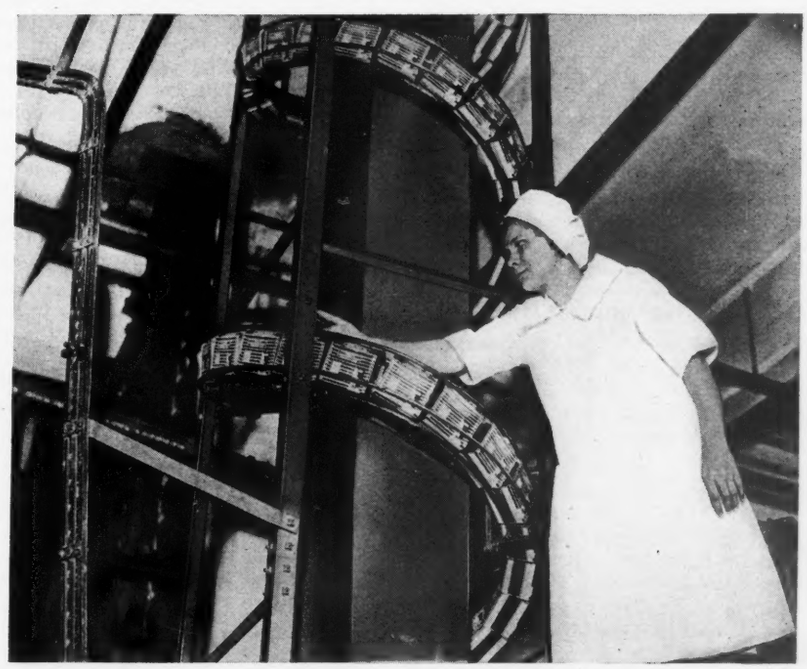
BRAIN FOOD, dismissed as a superstition by dietitians for several decades, may return to influence human development and give food advertisers a new talking point. In a recent lecture by Prof. E. V. McCollum, of Johns Hopkins University, he quoted experiments indicating that an infant diet deficient in vitamin B may retard development of mental capacity in later stages of adult life. So far, experiments have been confined to rats. Drs. Siegfried Maurer and Loh Seng Tsai, at the University of Chicago, found that young rats whose mothers were deprived of vitamin B during the first seven days of suckling were, when 100 days old, only half as quick in mental alertness as those having normal upbringing.

Vitamin B is widely distributed in both plant and animal food materials, wheat germ, rice polishings, and liver being particularly abundant sources.

" . . . RAW SUGAR dissolved in water, to which has been added a preservative to prevent fermentation—a small quantity of formaldehyde solution—is not within the common meaning of sugar syrups." Unanimously, the U. S. Customs Court in New York announced this decision on Feb. 15, and so blocked a tariff-law loophole that would have caused a revolution in the domestic sugar industry.

Almost a year ago, the Savannah Sugar Refining Corp. appealed from a similar original ruling by the Commissioner of Customs. The case arose from the fact that the 1930 sugar tariff contained no specific reference to mixtures of sugar and water testing less than 50 polariscope degrees. The Savannah company, contending that such a product must therefore fall into the "sugar syrup" classification, dutiable at ½c. per gal., mixed raw sugar with water and imported it in this form. By the expedient, 5 lb. of 96 deg. sugar in diluted form could have been brought in with ½c. duty instead of the 10c. ordinarily due on 5 lb. of raw sugar from Cuba.

The court held that the article had never been known in trade and commerce prior to the importation in this case. It upheld contentions of the government that the common meaning of "syrup" implies a more concentrated and viscous product. Although domestic sugar producers vigorously denounced the effort of the importer as a subterfuge to violate the intent of the law, the court upheld the right of the importer to resort to such a move in an attempt, although it was a futile one, to reduce its tax burden.



Acme

Metal houses on a mass-production basis have been predicted for the future by architects. Perhaps they look for inspiration at the "log cabins" that spiral down to sterilizing and filling machines in the General Foods Corp., syrup plant in Hoboken, N. J.

PERSONAL

JOHN H. BARRINGTON has been appointed manager of the new yeast plant of Anheuser-Busch, Inc., at Old Bridge, N. J. He was formerly manager of the yeast plant at St. Louis, Mo., where he has been succeeded by HENRY MEZENWERTH.

ROBERT B. BUTTERWORTH, chief confectionery buyer for F. W. Woolworth Co. for a number of years, has recently resigned because of ill-health. He is succeeded by C. H. TOLLE, who has been his assistant.

JOHN M. COLONY has been made vice-president and general manager of the Manton Gaulin Manufacturing Co., Inc., St. Johnsbury, Vt., following a reorganization in which STEPHEN PAINE succeeded JOHN W. DAVIES as president. Mr. Colony has recently been connected with the National Equipment Co.

MILO R. DAUGHTERS has been appointed director of research in charge of the laboratory of Pacific Frosted Foods, Inc., the Western division of Frosted Foods, Inc., General Foods subsidiary. The laboratory is located at Oakland, Calif.

CHARLES EIKEL, connected with Armour & Co. for more than 30 years, has been put in charge of a new department which will supervise quality of Armour products at all plants.

WILLIAM F. HEIDE, vice-president and general manager of Henry Heide, Inc., has been elected president to succeed his father, the late HENRY HEIDE.

ROBERT E. JONES, for the past six years secretary-manager of the Pacific Slope Dairy Show Association, has been appointed assistant to the president of Golden State Co., Ltd., prominent Pacific Coast dairy organization. He will have charge of advertising and public relations.

GORDON P. MOUGEY has been named assistant to the president of the Kroger Grocery & Baking Co., in charge of the merchandising division. Although Mr. Mougey was first associated with the Kroger company several decades ago, he has recently served as president of a voluntary grocery chain, the Associated Community Stores.

D. F. NORTON, vice-president of Nestle's Milk Products, Inc., has been elected president to succeed the late LEWIS R. HARDENBERGH. Mr. Norton joined the Nestle's organization in 1926, having formerly been connected with the Carnation Milk Co.

DAVID S. RALSTON, formerly assistant general superintendent of Allied Packers, Inc., and Hygrade Meat Products Co., Chicago, Ill., has been made plant manager of a new pork packing plant at San Luis Potosi, Mexico.

TRAVER SMITH, who has been in charge of Chase & Sanborn's coffee and tea products since 1929, has been elected vice-president of Standard Brands, Inc., of which Chase & Sanborn is a unit. Mr. Smith, who is 34 years of age, entered the service of the Fleischmann Co. in 1919 and was advertising manager of that company when Standard Brands was organized.

FRED H. UDELL, manager of the Denver (Colo.) plant of the Ralston Purina Co. and assistant treasurer of the company, will be transferred to the home office of the organization at Kansas City, Mo., it has been announced. He will be succeeded at Denver by W. T. CHAFFEE, formerly his assistant.

OBITUARY

ROBERT I. BENTLEY, chairman of the board of directors of the California Packing Corp., died in San Francisco, Calif., on Feb. 22. He was 67 years old. Mr. Bentley was president of the corporation from its organization in 1920 until 1930, when he was made chairman of the board. He was vice-president and general manager of the California Fruit Canners' Association from 1899 to 1916. At the time of

his death, he headed a number of other industrial and civic organizations, serving as chairman of the board of the Alaska Packers' Association, and as president of the San Francisco Opera Association and the California Automobile Association.

CHARLES F. BUNTE, vice-president of Bunte Brothers, Chicago confectionery firm, died on Feb. 16 in Chicago, Ill. Mr. Bunte, who was 60 years old, had been associated with the concern founded by his father and uncle since leaving college nearly 40 years ago.

JOHN DOESCHER, SR., president of Doescher Bros., Cincinnati, Ohio, candy manufacturer, died on Feb. 5 at the age of 84. Mr. Doescher was a charter member of the National Confectioners' Association.

FRED RASMUSSEN, for the past seven years executive secretary of the International Association of Ice Cream Manufacturers, died in Harrisburg, Pa., on Feb. 21, following a heart attack. He was a well known figure not only in the ice cream industry but throughout the dairy industry. Mr. Rasmussen was born in Denmark in 1876. He came to the United States in 1899 and was graduated from Iowa State University in 1905. Following a number of years of teaching, he became State Secretary of Agriculture in Pennsylvania. During the World War, he helped establish dairies in France at A.E.F. base hospitals.

WILMER SIEG, 72, one of the best known fruit men on the West Coast, died in San Francisco, Calif., on Feb. 4. For many years he was president of the California Fruit Distributors and was later head of the Fruit Men's Clearing House.

E. A. TOVREA, president of the Tovrea Packing Co., Phoenix, Ariz., died on Feb. 7. Last year, the name of the organization he headed was changed from the Arizona Packing Co. to the Tovrea Packing Co. in his honor. He had been president since 1919, when the firm was founded.

CHARLES E. VIRDEN, 57, president of the Virden Packing Co. since its organization in 1920, died in San Francisco, Calif., on Jan. 23.

TRADE NOTES

ALUMINUM SEAL CO., a division of the Aluminum Co. of America, Pittsburgh, Pa., has formed a "market research committee," under the chairmanship of J. D. Sharp, to provide special cooperation with packers of private brand food products. Merchandising as well as laboratory research on problems of container design and their salability will be conducted.

ASSOCIATED SHIPPERS OF AMERICA has been organized by 21 private and cooperative organizations in the South which ship about 150,000 cars of fresh fruits and vegetables a year. A master brand is to be established, and all merchandise shipped under this brand must grade better than U. S. No. 1.

BOVRIL OF AMERICA, INC., has been formed by Bovril, Ltd., of London, and the William S. Scull Co., of Camden, N. J., to control production and sale of the concentrated beef extract in the United States.

DAIRY AND ICE CREAM MACHINERY AND SUPPLIES ASSOCIATION, through H. H. Miller, president, has requested emphatic denial of rumors that Roberts Everett, executive vice-president of the organization, has any direct or indirect private interest in promoting the Dairy Industries Exposition, or that he profits thereby.

EASTMAN KODAK CO., Rochester, N. Y., has developed a transparent wrapping material made from cotton by the acetate method. Known as "Kodapak," the wrapping is said to be more limp than other forms of transparent cellulose, an advantage for many wrapping operations. Commercial production is expected soon.

H. R. HALL CO., Chicago (Ill.) coffee roaster, will merchandise cakes of ground coffee wrapped in transparent cellulose. The cakes fit into a percolator and will yield two cups of coffee.

PARKER FOOD SPECIALTIES, Brooklyn, N. Y., has been incorporated as Parker-Broeg, Inc., manufacturing an all-purpose packaged hot bread mixture.

PROCTER & GAMBLE CO. paid $926,000 in profit-sharing dividends to employees in 1931, it was recently announced. This is about $60,000 less than the 1930 distribution. Employees own or have subscribed to more than 200,000 shares of the stock.

SHUTTER-JOHNSON CANDY CORP., INC., has been formed as a result of a reorganization of the Shutter-Johnson Candy Co., Chicago, Ill. The petition in bankruptcy recently brought against the company was dismissed by the U. S. District Court when it was shown that assets exceed liabilities.

SWIFT & CO., Chicago, Ill., has purchased the plants of the Western Meat Packing Co. and the Oakland Meat Packing Co., both near San Francisco, Calif.

NEW EQUIPMENT FOR FOOD MANUFACTURERS

Low Capacity Speed Reducers Of Worm Gear Type

Designed to transmit up to about 7½ hp., the recent addition to the series of worm-gear speed reducers manufactured by the Cleveland Worm & Gear Co., 3258 East 80th St., Cleveland, Ohio, is available through a range of 24 ratios. Nine of these ratios, varying from 4 5/6:1 to 60:1 are standardized, whereas the other 15 are special.

This new size, which is designated as No. 70, may be obtained to operate through a horizontal or a vertical plane.

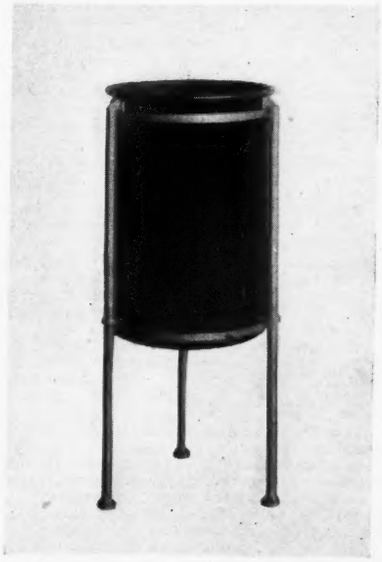
The horizontal type, shown in the illustration, is built with the worm above or below the gear, whereas in the vertical type the gear shaft may extend upward or downward.

All shafts of this unit are mounted in anti-friction bearings and, in the case of the vertical type, the gear shaft is said to withstand a downward axial thrust of 2,000 lb. The worm and its shaft are made from nickel-alloy steel forging and the gear from a solid chillcast, nickel-bronze blank. The worm thread is of the automotive type with a high-pressure angle.

Glass-Lined Units for Small Batches

In convenient capacities of 5 to 50 gal., the Pfaudler Co., Rochester, N. Y., has recently extended its line of glass-lined steel tanks and mixers. The one illustrated is a plain open tank on tubular pipe legs of any desired length.

Regardless of size, these units are available with or without legs, bronze-tinned bushing outlet, gage glasses, silver-plated globe valves, or ground key spigot. Also they may be fitted with a motor-driven, three-blade, bronze-tinned, high-speed agitator (450 r.p.m.) of the propeller type



with a Monel metal shaft and a one-piece heavily tinned or a clamped, glass-lined steel cover to make the unit airtight. Each unit is constructed from 13-gage special steel, lined with acid-resisting glass enamel and finished externally with a mottled black and white porcelain enamel.

In the food industries these containers doubtless will be in demand for use in handling syrups, fruit juices, flavoring extracts, vegetable oils, salad dressings, and food acids.

An Ever Up-to-Date Wrapping Machine

Composed of working parts that are assembled as separate and readily replaceable units, the 1932 model carton-wrapping machine of the Package Machinery Corp., Springfield, Mass., permits quick changes for variation in shape and size of packages.

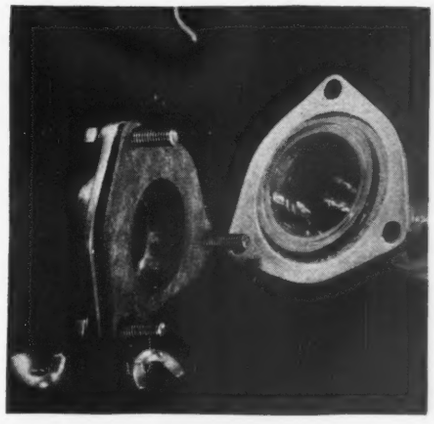
In addition to being flexible for handling a variety of packages, this machine enables the manufacturer of packaged foods to keep up with merchandising changes without having to buy new wrapping machines. It can be equipped for transparent cellulose, waxed or glassine paper, or printed wrappers. The replaceable units include the wrapper feed, discharge conveyor, and end-seal mechanism. This flexibility means that sheet or roll feed may be used; that heating plates for transparent cellulose or water-cooled plates for waxed paper wrapping may be had on the discharge conveyor; that printed designs may be registered on package; and that end-seals may be attached if desired.

Handwheel controls and simple screw adjustments make possible the wrapping of any sized package within the limits of 4x1¾x1¾ in. and 12x4¼x3¼ in. at the rate of approximately 75 packages per minute.

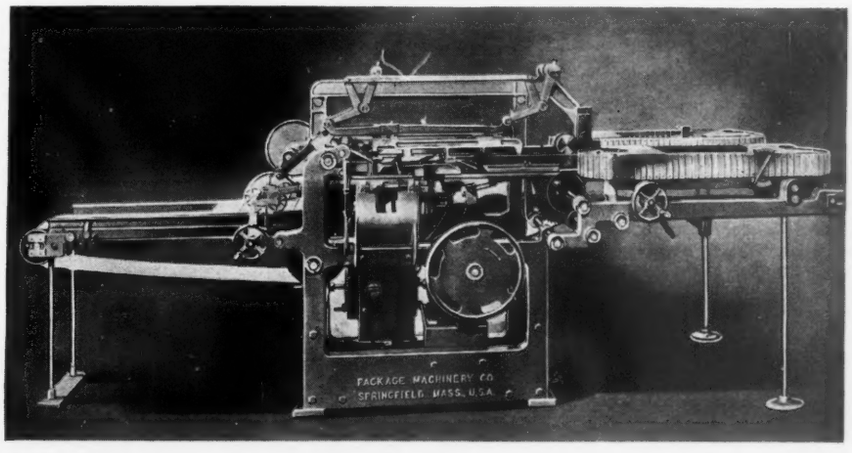
Joint for Glass Piping

Convenience, lightness, and security of union characterize the joint developed by the Corning Glass Works, Corning, N. Y., for its Pyrex piping to replace the heavy-shoulder-type joint previously used.

The inside diameter of the cast-iron flanges are just enough greater than the outside diameter of the slightly flared pipe



ends to allow the flanges to be slipped over the ends. As the pipes are assembled for joining, a strip of $\frac{3}{32}$-in. blue African asbestos gasket material is swagged between the inside beveled surface of the flange and the flared pipe end to hold the pipe firmly in place when the joint is made.



Between the two pipe ends a gasket is used to keep the glass ends from coming in contact with each other and to aid in preventing leaks. For fruit juices, milk, and other liquid foods a special paper gasket, $\frac{1}{8}$ in. thick, is supplied. This paper gasket is processed to be free from odor, flavor, or color that might be imparted to the foods and has an over-all shape of an equilateral triangle in the angles of which are holes through which pass the flange bolts to keep the gasket in place.

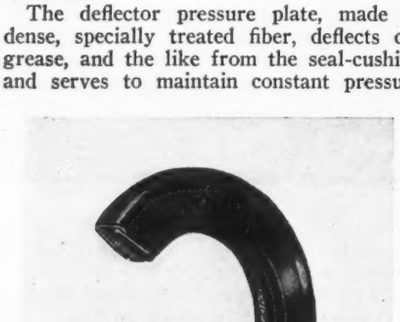
The pipes are cast with a decided concentric groove in the end faces, which are subsequently ground off slightly to give roughened surfaces to grip the gasket. As the flange bolts are tightened and the pipe ends slightly forced into the gasket, the grooves permit intrusion of enough gasket to make a more secure seal.

Oil Seal for Anti-Friction Bearings

A seal for low- as well as high-speed shafts which will not only hold grease but oil and will keep out grit, dirt, and water is being marketed by the Aetna Ball Bearing Manufacturing Co., Chicago, Ill.

It consists of four parts: an outer shell of steel, which houses a seal cushion, a pressure plate, and a steel retainer. The steel shell is precisely formed and is ground on outside diameter to an exactness of anti-friction bearings. The seal cushion consists of specially treated cork in which the air-containing spaces are hermetically sealed to cause the cushion to expand and contract automatically in a lateral direction with changing temperatures of shaft or lubricant. It is non-hygroscopic and impervious; is of great resiliency; has low friction coefficient; and is resistant to abrasives.

The deflector pressure plate, made of dense, specially treated fiber, deflects oil, grease, and the like from the seal-cushion and serves to maintain constant pressure



upon the cushion and uniform pressure over the periphery of the seal, at the same time relieving it of unnecessary internal pressure. In this manner the pneumatic seal is always maintained concentric with the shaft and is relieved of longitudinal pressure to overcome one of the most common causes of leakage by grease seals.

This oil seal is said to require no pretreatment or special precautions; to be capable of installation where space is cramped; and to be interchangeable with all makes of grease seals.

THE MANUFACTURERS OFFER

Glass-Lined Equipment—Glass-lined steel containers, mixers, and storage tanks with capacities ranging from 5 to 50 gal. are announced and described in bulletin 741 of the Pfaudler Co., Rochester, N. Y.

Squirrel-Cage Motors—Loose-leaf catalog bulletin No. 167, prepared by the Wagner Electric Corp., St. Louis, Mo., is devoted to description and illustrations showing the construction of type RP polyphase, squirrel-cage motors.

Clay Coated Paper—By means of an attractive folder, the Lowe Paper Co., Richfield, N. J., illustrates the color effects obtained by four-color printing on its Riggelo clay coated board, which finds use for packaging purposes.

Valves—Catalog No. 8 of the Merco Nordstrom Valve Co., 343 Sansome St., San Francisco, Calif., is a well-bound 172-page book describing and illustrating in detail the Nordstrom valves.

Oscillator Type Drive—The Eureka Buler Drive to replace eccentric drives on grain cleaners is described and illustrated in catalog No. 125 S of the Howes Co., Inc., Silver Creek, N. Y.

Hair Pads and Belts Darned—Darn-Knit Machine for repairing camel's hair materials with camel's hair thread and its operations are described and illustrated in an 8-page leaflet of the Johnson Manufacturing Co., P. O. Box 359, Atlanta, Ga.

Chemicals—The Roessler & Hasslacher Chemical Co., Empire State Building, New York, N. Y., in a 32-page booklet lists specifications, uses, and prices for its chemical products.

Forward With Stainless—An attractively bound and illustrated 32-page booklet of the American Stainless Steel Co., Commonwealth Bldg., Pittsburgh, Pa., gives uses for stainless steel and listing corrosive agents to which stainless steels are resistant.

Chocolate Products—Directions for the use of Walter Baker chocolate products with formulas are given in 24-page booklet. Walter Baker & Co., Inc., Dorchester, Mass.

Sirens—In Bulletin No. 38, Signal Division of the Federal Electric Co., Chicago, Ill., illustrates and gives specifications and uses for its various types of alarm sirens.

Leather Belting—By a folder leaflet and photographic illustrations, Charles A. Schieren Co., 30 Ferry St., New York, N. Y., calls attention to different types of leather for belting uses.

Aluminum in the Dairy Industry—A 15-page booklet prepared by Aluminum Co. of America, Pittsburgh, Pa., gives uses and reasons for use of aluminum in handling milk.

Speed Reducers — Herringbone - Maag speed reducers for small motor drives are described and illustrated in bulletin No. 53. Bulletin No. 51 is devoted to series DW with capacities up to 18 hp. W. A. Jones Foundry & Machine Co., 4401 Roosevelt Road, Chicago, Ill.

Pressure Controllers—Bulletin No. 2050-B of Neilan Co., Ltd., 641 Santa Fe Ave., Los Angeles, Calif., describes and illustrates by photographs and diagrammatic drawings instruments for controlling air or gas pressures.

Thermometers—In Bulletin No. 1037, C. J. Tagliabue Manufacturing Co., Park & Nostrand Aves., Brooklyn, N. Y., announces and describes its indicating thermometer with single degree division of a full 1/16 inch.

Slip-Ring Motors — Slip-ring induction polyphase motors ranging from ½ to 250 hp. are described and illustrated in a loose-leaf catalog folder of the Century Electric Co., 1806 Pine St., St. Louis, Mo.

Quick-Freezing — Equipment units for preparation and quick-freezing of citrus fruits by the Grayson method are illustrated and discussed in a folder prepared by the Polar Products, Inc., Atlanta, Ga.

Painting Equipment—In a loose-leaf type catalog, Spraco, Inc., 114 Central St., Somerville, Mass., gives diagrammatic drawings and halftones with detailed specifications for spray guns and accessories for painting and enameling.

Cocoa Butter Pressing — Equipment for hydraulic pressing of cocoa butter and repair parts are illustrated and described in a 16-page loose-leaf type catalog prepared by Fred S. Carver, 345 Hudson St., New York, N. Y.

Aluminum Paint — Aluminum Co. of America, Pittsburgh, Pa., devotes a 46-page booklet to the subject of aluminum paint and its uses.

Metal Caps—In a well-bound 11x14 book, beautifully and artistically illustrated by actual photographs, the Phoenix-Hermetic Co., 2444 West 16th St., Chicago, Ill., gives a pictorial story of metal cap manufacture and includes a catalog of Phoenix metal caps and their uses.

THE GOVERNMENT PUBLISHES

DOCUMENTS ARE AVAILABLE *at prices indicated from Superintendent of Documents, Government Printing Office, Washington, D. C. Send cash or money order; stamps and personal checks not accepted. When no price is indicated pamphlet is free and should be ordered from bureau responsible for its issue.*

Confectionery Distribution in United States, 1929-1930, by Edmund A. Flagg. Bureau of Foreign and Domestic Commerce, Domestic Commerce Series 50; 10 cents.

Cocoa in the Ivory Coast, by Leonard J. Schwarz. Bureau of Foreign and Domestic Commerce, Trade Promotion Series 125; 15 cents.

Fishery Industries of the United States, 1930, by R. H. Fiedler. Bureau of Fisheries, Appendix II to Report of Commissioner for Fiscal Year 1931; 80 cents.

Foreign Commerce and Navigation of the United States, Calendar Year 1930. Bureau of Foreign and Domestic Commerce, bound volume; $2. Import and export statistics.

Mailing of Admissible Liquids and Oils, Pastes, etc. Post Office Department, Order 1786. Amendment to postal laws and regulations.

Agricultural Outlook for the Southern States, 1931-32. U. S. Department of Agriculture, Miscellaneous Publication 137; 10 cents.

Federal Specifications. Federal Standard Stock Catalog Board specifications as follows: Canned corn, evaporated or dried applies, evaporated or dried peaches; vinegar, canned string (or snap) beans, canned pumpkin, canned spinach, canned tomatoes, lard, and canned sauerkraut; 5 cents each.

Some Factors Affecting Replacement of Commercial Fresh-Water Mussels, by M. M. Ellis. Bureau of Fisheries, Fishery Circular 7; 5 cents.

Effects of Pulp Mill Pollution on Oysters. Bureau of Fisheries, Fishery Bulletin 6; 30 cents.

Commercial and Industrial Organizations of the United States. Revised Edition, 1931. Bureau of Foreign and Domestic Commerce, Domestic Commerce Series 5; 85 cents.

CONSTRUCTION NEWS

Bakery — Golden State Baking Co., P. Antoneou, Pres., 2482 Railroad Ave., Fresno, Calif., leased building at 1602 A St. and will remodel for bakery and install new baking equipment. Estimated cost $25,000.

Bakery—Kroger Grocery & Baking Co., A. S. Grogg, Gen. Mgr., 3801 Vista Ave., St. Louis, Mo., and 35 East 7th St., Cincinnati, O., will soon award contract for a 4 story, 85 x 190 ft. bakery building including garage, office, boiler room, salvage room, also extensive alterations to existing building, including loading dock, etc., at 1311 South 39th St., St. Louis. Estimated cost $700,000. Emil E. Niemann, 3816 Shaw Ave., St. Louis, is architect.

Bakery Addition—C. O. Eith, 164 Tyrner St., Auburn, Me., awarded contract for addition and alterations to bakery at Spring and Hampshire Sts., to J. C. Boucher, 37 Chestnut St., Lewiston.

Bakery Addition—Guisti Baking Co., 1395 Purchase St., New Bedford, Mass., plans addition and alterations to bakery. Estimated cost $40,000 to $50,000. Architect not selected.

Brewery—Brading Breweries Ltd., 451 Wellington St., Ottawa, Ont., awarded general contract for a 1 story addition to brewery to A. J. Garvock, Regent Theatre Bldg., Ottawa. Estimated cost $50,000.

Distillery—Highland Scotch Distillers, J. B. Disher, Mgr., Port Colborne, Ont., plans extensions and improvements to plant including additional story to existing plant, new boiler house, rack warehouse and installation of new equipment.

Canning Plant—Western Canning Co. Ltd., c/o H. Schuster Co., 354 Hobart St., Oakland, Calif., Contrs., awarded contract for construction of a canning plant at Chico.

Canning Plant (Asparagus)—Libby McNeil & Libby, Union Stock Yards, Chicago, Ill., will soon let contract for reconstructing part of asparagus canning plant at Ryde, Calif., destroyed by fire. Estimated cost to exceed $100,000. Equipment will be purchased.

Creamery—Banner Creamery, c/o O. B. Dillingham, San Angelo, Tex., will soon award contract for construction of a 1 story, 40 x 60 ft. unit to creamery plant. Estimated cost $25,000. Davis R. Castle Co., 701 Alexander Bldg., Abilene, is architect. Equipment including bottler, separator, etc., will be required. Address owner direct.

Creamery Plant—Colby Creamery, c/o R. C. Colby, San Angelo, Tex., having preliminary plans prepared for construction of a creamery plant. Private plans. Machinery and equipment will be required.

Creamery Plant—Mistletoe Creameries Inc., W. N. Fralay, Gen. Mgr., El Paso, Tex., will soon award contract for construction of a 1 story, 92 x 120 ft. creamery plant including machinery, electrical appliances, etc., on Myrtle St. Estimated cost $80,000. Guy L. Frazer, El Paso, is architect.

Creamery and Ice Cream Plant—Stock Co., c/o C. Daniels, Waurika, Okla., and Mexia, Tex., plans construction of a creamery and ice cream plant at Mexia. Private plans. Machinery and equipment will be purchased and installed.

Dairy Plant—Crystal Dairy Ltd., 1803 Commercial Dr., Vancouver, B. C., awarded contract for construction of a 1 story, 31 x 70 ft. addition to dairy building, including compressor, refrigeration plant, etc., to Dominion Construction Co. Ltd., 509 Richards St., Vancouver. Estimated cost $20,000. Equipment consisting of pasteurizer, cooler, churn, can and bottle washers will be installed.

Dairy Plant—Dairy Delivery Co., 2550 19th St., San Francisco, Calif., subsidiary of Borden Co., 350 Madison Ave., New York, N. Y., having preliminary plans prepared for consrtuction of a dairy plant and distribution building on Potrero Ave., San Francisco. Estimated cost exceed $150,000. W. H. Toepke, Call Bldg., San Francisco, is architect.

Dairy Plant—Ferndale Dairy Co., Circleville, N. Y., plans construction of a 2 story dairy plant. Estimated cost $40,000. Architect not selected.

Dairy Plant—Sanitary Farm Dairies, Inc., c/o A. E. Riedel, Secy. and Treas., 2728 Washington Ave., Houston, Tex., having plans prepared for construction of a dairy plant. Joseph Finger, 711 National Standard Bldg., Houston, is architect. Walter P. Moore, Kress Bldg., Houston, is engineer.

Dairy Plant—J. Weissglass, 2014 Forrest Ave., Elm Park, S. I., N. Y., will soon award contract for construction of a 1 story dairy plant including pasteurizing, creamery and bottling plants, etc. Estimated cost $40,000. M. G. Uslan, 57 Bay St., St. George, is architect.

Dairy Plant Addition—Grandnier Dairy Co., Metropolitan Ave. and Mary St., Ridgewood, N. Y., awarded contract for addition to plant to Peter Murray, c/o owner. Estimated cost $30,000.

Dairy Plant Addition—St. Louis Dairy Co., 2000 Pine St., St. Louis, Mo., having preliminary plans prepared for a 1 story, 60 x 100 ft. addition to dairy plant at 4161 Gravois St. C. Wolf, 2 South Central St., Clayton, is architect.

Ice Cream Plant—John T. Cunningham Ice Co. Inc., 2238 Harrison St., Chicago, Ill., awarded contract for construction of a 2 story, 124 x 162 ft. ice cream plant to Equity Construction Co., 608 South Dearborn St., Chicago. Estimated cost $300,000.

Ice Cream Plant — Furness Ice Cream Co., South Bend, Ind., awarded general contract for construction of a 2 story, 90 x 145 ft. ice cream plant including hardening manufacturing, filling, dry ice and shipping rooms, refrigeration system, etc., to Equity Construction Co., 608 South Dearborn St., Chicago. Estimated cost $150,000.

Ice Cream Plant—Ness Creameries, Clifton Cox, Mgr., Biloxi, Miss., awarded contract for a 1 and 2 story, 50 x 100 ft. ice cream plant at Callavet and West Howard St., to W. C. Stout & Son. Jackson. $35,811.

Milk Plant Addition—Donnell Milk Co., 816 South Taylor Ave., St. Louis, Mo., awarded contract for a 2 story, 32 x 59 ft. addition to milk plant to Baerveldt & Honig Construction Co., 624 Wainwright Bldg., St. Louis.

Milk Products Plant—Sheffield Milk Co., Inc., L. H. Brown, Dist. Mgr., Burlington, Vt., will build a 2 story, 60 x 165 ft. milk products plant at Vergennes. Estimated cost $40,000. Work will be done by owner's forces.

Cold Storage and Poultry Dressing Plant—Dixie Products Inc., St. George, Utah, having plans prepared for construction of a cold storage, ice and poultry dressing plant at Washington. Estimated cost $40,000. Architect not selected.

Cool Room—Vancouver Harbor Commission, Dunbury Ave., Vancouver, B. C., plans construction of a cool room for storage of 100,000 boxes of apples including cooling equipment and mechanical devices for handling boxes of apples from cars to cool room and cool room to ships' holds. Estimated cost $50,000. H. W. Frith, c/o Harbor Commission, is engineer.

Ice Plant—H. C. Batchelder, 170 Lynn St., Peabody, Mass., awarded contract for construction of a 1 story, 50 x 192 ft. artificial ice plant to E. C. Blanchard, 940 Broad St., Lynn; equipment to York Ice Machinery Corp., 200 Causeway St., Boston. Estimated total cost $40,000.

Ice Plant—Highland Ice Co., 319 Sigourney St., Hartford, Conn., having plans prepared for a 1 story, 50 x 125 ft. ice manufacturing plant, 50 ton daily capacity on Wethersfield Ave. Estimated cost $75,000. Raymond E. Palmer, 56 Suffolk St., Holyoke, Mass., is architect. Contract for equipment awarded to York Ice Machinery Corp., 2nd Ave. and 42nd St., Brooklyn, N. Y.

Ice Plant—Holyoke Ice Co., W. T. Wilson, Treas., 65 Prospect St., Holyoke, Mass., awarded contract for a 1 story, 60 x 120 ft. ice manufacturing plant at Walnut and Prospect Sts., to Casper-Ranger Construction Co., 20 Bond St., Holyoke. Estimated cost $40,000.

Ice Plant—Kincardine Pure Ice Co., William and Frank Morgan, Kincardine, Ont., having plans prepared for a 1 story, 40 x 100 ft. ice plant to be equipped with electrically operated equipment.

Ice Plant—Alfred Littell, Franklin, N. J., having plans prepared for a 1 story artificial ice plant. Estimated cost $40,000. Architect not selected.

Ice Plant—Miller-Rasmusser Ice Co., 1105 North Broadway, Green Bay, Wis., will build a 1 story, 62 x 100 ft. ice storage plant, by day labor. Estimated cost $40,000. Private plans.

Ice Plant—A. W. McKinstrey, Webster, Mass., will build a 1 story ice plant on West Main St. by day labor. Estimated cost $40,000. Private plans.

Ice Plant—M. K. Pickett & Son, 21 Townsend St., Newton, N. J., having plans prepared for construction of a 1 story artificial ice manufacturing plant. Estimated cost $40,000. Architect not announced.

Ice Plant—Quix Kold Corp., Norman, Okla., preliminary plans prepared for construction of a dry ice plant at Oklahoma City. Estimated cost $40,000. H. A. Wright, Norman, is engineer.

Ice Plnat Addition—Norwood Ice Co., A. A. Grant, in charge, Merrick Lane, Northampton, Mass., having plans prepared for a 2 story addition to artificial ice plant on Easthampton Road. Estimated cost $40,000. R. E. Palmer, 56 Suffolk St., Holyoke, is engineer.

Ice Manufacturing Plant—Harris Ice Co. Inc., Day St., Leominster, Mass., receiving bids for a 2 story ice manufacturing plant on Main St., North Leominster. Estimated cost $50,000. Private plans.

Ice Manufacturing Plant—Tatnuck Ice Co., Brookside Ave., Worcester, Mass., awarded contract for construction of a 1 story, 65 x 105 ft. ice manufacturing plant on Mill St., to E. D. Ward Co., 82 Foster St., Worcester. Estimated cost $40,000.

Jam Factory and Flour Mill—Christian Community, Peter Veregin, Veregin, Sask., plans construction of a jam factory, power plant and flour mill. Estimated total cost $120,000. Interested in prices on equipment.

Pie Plant Addition—Brisbie Pie Co., 363 Kossuth St., Bridgeport, Conn., plans addition to plant on Maple St. Estimated cost $40,000. Private plans.

Cereal Plant — Three-Minute Cereals Co., Cedar Rapids, Ia., having plans prepared for a plant for the manufacture of breakfast cereals at Mexico City. Estimated cost to exceed $40,000.

Flour Mill—Nebraska Consolidated Mills Co., 1521 North 16th St., Omaha, Neb., awarded contract for construction of a 2 story flour mill to John Lof & Sons, 4006 Lake St., Omaha, $40,000; machinery and equipment to Allis-Chalmers Mfg. Co., West Allis, Wis., $38,000.

Grain Elevator—R. L. Colex Co., Krum, Tex., plans to rebuild grain elevator, 20,000 bu. capacity recently destroyed by fire. Work will be done by day labor . Interested in prices on motor-driven equipment, grain elevator legs with speed reducers for elevator heads.

Grain Elevator—Farmers Elevator Co., P. H. Hohnstein, Mgr., Giltner, Neb., having preliminary plans prepared for a grain elevator, 30,000 bu. capacity.

Plant—Commercial Milling Co., V. M. Wintermantel, in charge, 305 Ferry St., Pittsburgh, Pa., will soon award contract for a 1 story, 34 x 271 ft. warehouse at Irwin, West North and Beech Sts. Estimated cost $50,000. Private plans.

Abattoir — United Butchers Abattoir Co., Arthur Monk, Pres., 3055 Ludlow St., Philadelphia, Pa., awarded contract for a 1 and 2 story, 72 x 148 ft. building to Barclay White & Co., Roosevelt Blvd. and Adams St., Philadelphia, Pa. Estimated cost $200,000.

Abattoir Addition—Feldman Bros., Laurel St., Elizabeth, N. J., will soon award contract for a 1 story addition to abattoir building. Estimated cost $40,000. A. J. Silberstein, 892 18th Ave., Newark, is architect.

Abattoir Building Equipment—Alex Ames & Sons, Sherbrooke, Que., plans to purchase machinery and equipment for abattoir building.

Packing Plant (Meat)—Armour & Co., 316 South La Salle St., Chicago, Ill., and 30th and I Sts., Omaha, Neb., plans alterations to and re-equipment of meat packing plant for use natural gas at Omaha, Neb. Estimated cost $250,000.

Packing Plant (Meat)—Cudahy Packing Co., 1321 Jones St., Omaha, Neb., plans alterations and re-equipment of meat packing plant. Estimated cost $250,000.

Packing Plant (Meat)—Swift & Co., Packers and Exchange Aves., Chicago, Ill., and 27th and I. Sts., Omaha, Neb., plans alterations and re-equipment of meat packing plant for use natural gas at Omaha. Estimated cost $250,000. Also awarded contract for a 2 story, 85 x 100 ft. wholesale meat market at Wilkes-Barre, Pa., to William Steele & Sons Co., 124 North 15th St., Philadelphia.

Packing Plant (Fruit)—Bitter Root Packing Corp., c/o F. T. Parker, Hamilton, Mont., completing plans for 3 story, 60 x 120 ft. fruit packing and refrigeration plant. Estimated cost $200,000. R. C. Hugenin, 1023 West Porphry St., Butte, is architect.

Packing Plant (Vegetable)—Colma Vegetable Association, 511 Davis St., San Francisco, Calif., having plans prepared for construction of a packing plant at Colma. Estimated cost $40,000. Private plans.

Fruit and Vegetable Terminal—Southern Pacific Co., Southern Pacific Lines (in Texas and Louisiana) Texas & New Orleans R.R. Co., Houston, Tex., having plans prepared for extending fruit and vegetable terminal including 60 x 540 ft. additional units, etc., at New Orleans, La. R. W. Barnes, Houston, is chief engineer.

Packing Plant—Dumart Packing Co., Guelph St., Kitchener, Ont., plans a 3 story addition to packing plant. Estimated cost $50,000. J. C. Klaehm, 129 King St. W., Kitchener, is architect.

Packing Plant—Essem Packing Co. Inc., 101 Beacon St., Lawrence, Mass., receiving bids for a 2 story addition to packing plant. Estimated cost $40,000. Worcester Tram Rail Co., Inc., 10 T. Wharf, Boston, is engineer.

Packing Plant — Ling Packing Co., Nampa, Idaho, plans additions and alterations to present packing plant. Estimated cost $150,000. Architect not announced.

Packing Plant—Mount Whitney Packing Corp., Armona, Calif., plans reconstruction of packing plant destroyed by fire. Estimated cost $40,000.

Packing Plant—Sheehy & Cummings, Hollister, Calif., plans construction of a 1 story, 50 x 180 ft. packing plant.

Packing Plant Addition—Oscar Mayer & Co., Madison, Wis., awarded contract for a 1 story, 56 x 90 ft. addition to packing plant including electric refrigeration system, etc., on Wilson Ave., to C. B. Fritz Co., 138 North Frances Ave., Madison, Wis. Estimated cost $40,000.

PATENT DIGEST

Baking and Milling

Unit Baking Plant for Production of Biscuits—Edward Milner Crosland, Newton-le-Willows, England. No. 1,836,361. Dec. 15, 1931.

Doughnut Depositing Machine—Charles E. Carpenter, Chicago, Ill. No. 1,833,933. Dec. 1, 1931.

Packaged, Ready-to-Bake Biscuits Cut by Tubular Device Operated by Suction and Plunger Action—Lively B. Willoughby to Ballard & Ballard Co., Louisville, Ky. No. 1,834,012. Dec. 1, 1931.

Mechanical Means for Turning Doughnuts During Frying Operations—Frank M. Roehl to National Automatic Doughnut Machine Co., Minneapolis, Minn. No. 1,834,182. Dec. 1, 1931.

A Calcium Lactate Acid Pyro-Phosphate Baking Powder—William E. Stokes, Brooklyn, N. Y., and Reginald A. Wright, Cedarhurst, N. Y., to Royal Baking Powder Co., New York, N. Y. No. 1,834,747. Dec. 1, 1931.

Adjustable Curler Apron for Dough Molding Machine—Orville Sisson, Herington, Kan., one-half to Thomson Machine Co., Belleville, N. J., and one-half to J. H. Day Co., Cincinnati, Ohio. No. 1,827,958. Oct. 20, 1931.

Bread Packed Automatically Into Shipping Baskets—Axel J. Andersen, San Francisco, Calif. No. 1,828,238. Oct. 20, 1931.

Compressed Flour Removed From Bran by a Rotating Horizontal Cylinder Into Which Air and the Flour-Laden Bran Enter so That Violent Whirling Action Is Produced—Thomas Edgar Forster, Wichita, Kan. No. 1,828,247. Oct. 20, 1931.

Cup-Cake Dropping Machine—Martin Helland, Tacoma, Wash. No. 1,828,565. Oct. 20, 1931.

Baking Oven With Reheated Gases Circulating Over Tops and Bottoms of Products Being Baked—Louis Charles Reese to Baker Perkins Co., Inc., Saginaw, Mich. No. 1,829,670. Oct. 27, 1931.

Multiple Baking Pan Units Inclosed Within a Single Continuous Frame—Elmer H. Chandonia, Ludlow, Ky., to the Lockwood Manufacturing Co., Cincinnati, Ohio. No. 1,830,191. Nov. 3, 1931.

Rotating Stencil Type Machine for Applying Icing or Coating Material to Biscuits—Edward Milner, Crosland, to T. & T. Vicars, Ltd., Earlestown, Newton-Le-Willows, England. No. 1,830,425. Nov. 3, 1931.

Canning and Glass Packing

Metal Cans for Foods Having Side Body Portions Made From Harder Metal Than the Ends—Edward F. Kohman to National Canners' Association, Washington, D. C. No. 1,837,051. Dec. 15, 1931.

Machine for Closing Cans With a Cap Closing Hole One End of Can and Swagging Cap to Insure Closure of Can—Alson J. Sprague, Middletown, N. Y. to The Borden Co., New York, N. Y. No. 1,829,199. Oct. 27, 1931.

Fruit Packed Mechanically in Case and Held Under Pressure While Case Is Being Closed—Edward F. Meer, Monrovia, Calif. No. 1,829,230. Oct. 27, 1931.

Canned Products Cooled in Bulk by Being Dipped in Circulating Cooled Liquids by Means of Open-work Baskets—Walter F. Wegner to Fruit Belt Preserving Co., East Williamson, N. Y. No. 1,829,717. Oct. 27, 1931.

Casein Protective Coating for Metallic Containers of Acid Food Products—Alan C. Richardson, Menlo Park, Calif., to California Packing Corp., San Francisco, Calif. No. 1,830,244. Nov. 3, 1931.

Confectionery

Cream Caramels Formed and Cut Mechanically—Max Pönisch, Leipzig, Germany. No. 1,839,050. Dec. 29, 1931.

Sucker Type of Confection Molded From Continuous Strips of Material With a Predetermined Cross-Sectional Pattern—William Walter, New York, N. Y., to Racine Confectioners' Machinery Co., Racine, Wis. No. 1,839,719. Jan. 5, 1932.

Milk and Cream Chocolate Produced by Using Dehydrated Mass of Milk or Cream Cocoa Powder, Butter and Sugar at Temperatures During Refining to as High as 85 Deg. C.—Philip Born, Bad Homburg, Germany, to Naamlooze Vennootschap, Nederlandsche Gruyère-Blokmelk Fabrik, Zwolle, Holland. No. 1,836,303. Dec. 15, 1931.

Mechanized Production of Candy Canes—Brasher O. Westerfield to Bunte Bros., Chicago, Ill. No. 1,836,349. Dec. 15, 1931.

Dairy and Egg Products

Milk Bottle Indented Inwardly on One Side to Aid in Cream Separation—George E. West to Dave Metzger, Dallas, Texas. No. 1,835,252. Dec. 8, 1931.

Ice Cream Slabs Cut Into Strips by Mechanical Means—John Schultz, Cleveland, Ohio. No. 1,833,266. Nov. 24, 1931.

Method of and Crates for Packing Conical Milk and Fruit Juice Bottles—Harold S. Lion to United Milk Crate Corp., Cincinnati, Ohio. No. 1,833,949. Dec. 1, 1931.

Copies of Patents

Complete specifications of any United States patent may be obtained by remitting 10c. to the Commissioner of Patents, Washington, D. C.

Photostatic copies of foreign patents may be obtained at the same address, prices being forwarded on application.

Copies of patents should be ordered by number, as titles used in this digest seldom correspond with title of patent.

Eggs Candled and Handled Mechanically—Rickard B. Grisham, Homer H. Vandivort, Luther L. Grisham and Ray C. Miles, Elk City, Mo. No. 1,831,302. Nov. 10, 1931.

Bottle Washing Machine—Irving R. Hippenmeyer, Waukesha, Wis., to Creamery Package Manufacturing Co., Chicago, Ill. No. 1,831,352. Nov. 10, 1931.

Paired Endless Belt Conveyors for Can Washing Machines—Irving R. Hippenmeyer, Waukesha, Wis., to Creamery Package Manufacturing Co., Chicago, Ill. No. 1,831,388. Nov. 10, 1931.

Fruits and Vegetables

Fruit Covered With Chlorinated Waxes to Prevent Shrinkage—Rex De Ore McDill, Riverside, Calif., to Food Machinery Corp., San Jose, Calif. No. 1,836,267. Dec. 15, 1931.

Fruit Shredded on Motor-Driven Grating Machines With Two Grating Surfaces—William D. Bost to the Orange Crush Co., Chicago, Ill. No. 1,838,210. Dec. 29, 1931.

Orange Juice Preserved by Heating to 50-60 Deg. C. in Holding Tank Followed by Heating to 65-75 Deg. C. While Flowing—Daniel M. Smalle to Dr. P. Phillips Co., Orlando, Fla. No. 1,838,517. Dec. 29, 1932.

Fruit Pulping Machines With a Power-Driven Spindle That Is Equipped With a Spring Loop to Expand Within the Fruit as the Pulp Is Reamed Out—Harvey Hurst, South San Francisco, Calif. No. 1,838,626. Dec. 29, 1931.

Vegetable Extracts Prepared by Solvent Action From Vegetables in Frozen State—Donald K. Tressler, Gloucester, Mass., to Frosted Foods Co., Inc., Dover, Del. No. 1,840,798. Jan. 12, 1932.

Peas Graded to Size by Series of Sieves in Which Water Is Used as a Cushion to Prevent Mechanical Damage During Grading Operations—Charles Edwin Rife, Baltimore, Md. No. 1,841,299. Jan. 12, 1932.

Citrus Fruits Cored and Sliced on Machine With Rotary Cutting Surfaces—Carol Floyd and Daniel M. Smalle to Dr. P. Philips Co., Orlando, Fla. No. 1,825,628. Sept. 29, 1931.

Citrus Fruits Mechanically Bisected and Subsequently Sliced Through Plane at Right Angles to Bisecting Cuts—Carol Floyd to Dr. P. Philips Co., Orlando, Fla. No. 1,825,629. Sept. 29, 1931.

General Equipment

Apparatus for Quick-Freezing by the Floating Pan Method—Robert E. Kolbe, Erie, Pa. No. 1,835,881. Dec. 8, 1931.

Perishable Food Display Case With Brine Holding Compartment in Lower Portion and Freezing Coil Refrigeration in Display Chambers—Worth H. Percival to C. L. Percival & Co., Des Moines, Iowa. No. 1,840,738. Jan. 12, 1932.

Display Cabinet With Rear Refrigerating Chamber and Display Compartments Sloping From Rear to Front—John Edward Gloekler, Pittsburgh, Pa. No. 1,840,943. Jan. 12, 1932.

Coffee Roasting Unit Including Roaster, Cleaner, and Aspirator—Charles T. Howson, Silver Creek, N. Y. No. 1,843,131. Feb. 2, 1932.

Refrigerated Cars Cooled by Solid CO and Filled With Resulting Gaseous CO_2 for Preservation of Perishable Materials—James W. Martin, Jr., Yonkers, N. Y., to Dryice Equipment Corp., New York City. No. 1,825,643. Sept. 29, 1931.

Meat Packing

Method for Handling Fresh Carcasses to Prevent Distortion During Chilling—John C. Agar to Swift & Co., Chicago, Ill. No. 1,837,514. Dec. 22, 1931.

Refrigerating Plant for Sharp-Freezing Fish and Other Perishables—Oscar Dahl and Erik Arnfinn Hallgrim Kjörstad, La Rochele, France. No. 1,838,366. Dec. 29, 1931.

Solid Matter Recovered From Waste Meat Pickle Liquor by Use of Sulphonic Acid—Emile Scheitlin, Basel, Switzerland. No. 1,840,134. Jan. 5, 1932.

Margarine Chilled in Water Bath and Removed From Bath by Means of a Bucket Type Conveyor—Marvin C. Reynolds, Chicago, Ill. No. 1,842,732. Jan. 26, 1932.

Miscellaneous Products and Processes

Plastic Food Materials Formed and Wrapped in a Unit Machine—Newell Beatty, Hinsdale, Ill., to Durkee Famous Foods, Inc., Chicago, Ill. No. 1,834,997. Dec. 8, 1931.

Coffee Aroma Imparted to Soluble Coffee by Intimate Contact With Freshly Roasted Coffee—Alfred W. Meyer and Lewis W. Haas to W. E. Long Co., Chicago, Ill. No. 1,836,931. Dec. 15, 1931.

Cashew Nut Oil as Base for Varnish and Container Manufacture—Mortimer T. Harvey, New York, N. Y., to Harvel Corp., Hoboken, N. J. Nos. 1,838,070; 1,838,071; 1,838,073; 1,838,074; 1,838,076; and 1,838,077. Dec. 22, 1931.

Reaction Products of Cashew Nut Shell Oil—Victor A. Ryan, Maplewood, N. J., to Harvel Corp., Hoboken, N. J. No. 1,838,072. Dec. 22, 1931.

Cashew Nut Shell Liquid Used to Waterproof Masonry Walls—Mortimer T. Harvey, Newark, N. J. No. 1,838,075. Dec. 22, 1931.

Cereal Grains Puffed by Sudden Release of Pressure—John L. Ferguson, Joliet, Ill. No. 1,839,917. Jan. 5, 1932.

Cereal Food Product Made by Processing Wheat, Barley and Oat Grains—Scott H. Perky, Batavia, N. Y. No. 1,839,928. Jan. 5, 1932.

Short Macaroni Given Preliminary Drying on Geared Conveyor Belt—Salvatore Bucaro to Consolidated Macaroni Machine Corp., Brooklyn, N. Y. No. 1,842,245. Jan. 19, 1932.

Honey-Flavored Jelly—Glenn H. Joseph, Ontario, Calif., to California Fruit Growers' Exchange, Los Angeles, Calif. No. 1,842,673. Jan. 26, 1932.

Jelly Powder Consisting of Anhydrous Sugar, Edible Acid, and Powdered Pectin—Herbert T. Leo, Corona, Calif. No. 1,842,757. Jan. 26, 1932.

Method for Making a Fruit-Flavored Pectin Jelly—William A. Rooker and Victor E. Speas to Speas Manufacturing Co., Kansas City, Mo. No. 1,842,768. Jan. 26, 1932.